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AUGUST 30, 1934

ESTABLISHED 1855

Vol. 134, No. 9

You Can't Prime a Pump That Has Leaking Valves

IT SHOULD soon become apparent, even to the impractical visionaries who are devising the magnificent schemes for the dissipation of public funds that the pump of business cannot be primed with public money.

The reason for this is simple. Private dollars, saved through thrift and self-denial or earned by capable management, have acquired good habits and have learned to shun bad company. The hard-earned dollar is mortally afraid of the easily gotten public dollar that is recklessly squandered by visionaries, politicians and world reformers who have never been noted either for earning or saving ability.

The more profligate of expenditure the Government becomes; the more millions and billions it distributes as largess under the guise of "pump priming," the less chance there is of coaxing private funds back into industry and business.

The Administration has carried on its pump priming experiment for well over a year. It has poured approximately ten billion dollars into a pump with leaking valves. Naturally, it has failed utterly to tap the great underlying reservoir of private capital goods investment funds on which recovery and re-employment depend.

The valves of the business pump are lined with confidence. Unless Government can restore that essential valve lining, there will be no suction upon private funds, even though the last public dollar is used for priming.

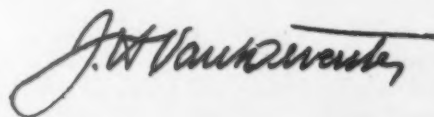
IT DOES not make for confidence when a year's drive to put men back to work has resulted in adding one man to bureaucracy's payroll for every two men restored to private employment; nor when production and employment are going down in the face of rising prices and cost of living.

It does not make for confidence when class consciousness is definitely encouraged by legislative and administrative acts and class antagonisms are fostered upon unprecedented scale. Nor when the public sees the "best laid plans of mice and men" of the AAA go haywire overnight and turn a food surplus into a serious deficit.

It does not make for confidence to see the Constitution sidetracked in favor of an alphabetical conglomeration of boards and bureaucracies which are usurping the functions of National and State governments. Nor to hear, week after week, from high places, the proposals for grandiose construction and social schemes that would dazzle the imagination of a Pharaoh and arouse the envy of ancient Roman emperors.

* * *

WHAT is needed for recovery is not the proposed reformation of business character but a restoration of business confidence. Now that the pump priming has not worked, why not examine the valves?



A Microscopic Analysis of Sp

THE spraying of metals in a finely divided form is far from new, and much has been written concerning the process during the past decade. However, the various propounders of the process dwelt almost exclusively on its industrial and aesthetic uses, both real and imaginary. The basic principles involved were largely ignored, and practically no microscopic or strictly technical investigations of the sprayed metal particles were made.

Of course, a considerable amount of fairly accurate information concerning the mechanism of the process was collected in a rule-of-thumb manner during the evolution of spraying techniques and the development of spray pistols, but only during recent years has the deposited metal been placed under a microscope and studied with regard to its texture and adhesion. The following discussion deals primarily with microscopic aspects of the coatings, and the observations contained herein represent elaborations of laboratory results as reported by Dr. Schenk in Berlin and H. Reininger in Leipzig.

With regard to the inception of metal spraying, history has it that somewhat prior to 1909 Dr. M. U. Schoop, of Zurich, Switzerland, observed the apparent welding of overlapped lead bullets which had been fired against a wall. He subsequently conducted a series of experiments in an attempt to simulate the bullet action on a smaller scale, but he was unsuccessful at first. Thereupon he took an already familiar process and obtained fairly good coatings by projecting molten metal from a crucible by means of compressed air.

The essentials of this process, however, had been employed in Germany and Switzerland since 1882 as a means of obtaining fine lead powder. The usual method was to melt a metal in a crucible, from which it issued into a gaseous blast which projected the metal on to a rapidly rotating paddle wheel contained within a chamber. The action of the wheel broke up the metal stream, after which the parti-

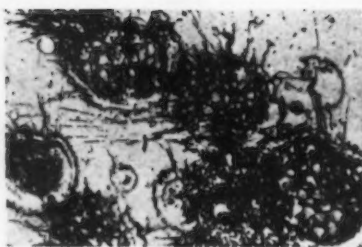


Fig. 1—Several copper particles after being sprayed on a glass plate. Viewed at 15 diameters.

cles impinged on to an inner wall of the chamber which was kept wet with a water film to prevent adhesion. The solidified metal particles rebounded from the wall and were collected in powder form in a tank below. This finely divided metal was mixed with a liquid and used as paint. Since the entire procedure was rather common at the time, it was strange that no one prior to Dr. Schoop realized that if the chamber wall was kept dry a coating of metal would be formed.

Dr. Schoop's original pistol has been modified to some extent, but the basic action today is identical with that in 1909. In this country the Schoop wire pistol was improved by the Metals Coating Co. of America and its action is familiar to many. Any metal in the form of wire can be automatically fed into the hot zone

of an oxy-hydrogen or oxy-acetylene blowpipe flame which causes a globule of molten metal to form continuously on the end of the wire. This molten drop is atomized by a blast of air, and the particles are driven forward and at a high velocity impinge on the surface to be coated.

It is apparent that the time interval for the vaporization of the wire may at times result in a limited speed of application of metal. In an attempt to increase the volume of metal available per unit time, as well as to simplify the gun mechanism, Christian Johan Jung developed a variation in Holland in 1928. This instrument is designated as a Mellozing pistol and is distributed by Mellowes & Co., Ltd., Sheffield, England. It has a reservoir which can accommodate about 4 lb. of metal previously melted in an independent gas-heated crucible. As in the original powder-producing apparatus of 1882, the molten metal in the Mellozing pistol issues from a small nozzle in a fine stream. A heated blast of air thereupon atomizes the metal and projects it forward.

There are disadvantages to the Mellozing procedure. The choice of spraying metals is limited to those which have low melting points, and the pistol is of necessity constructed of metal having a high melting point. The result is that the finished pistol

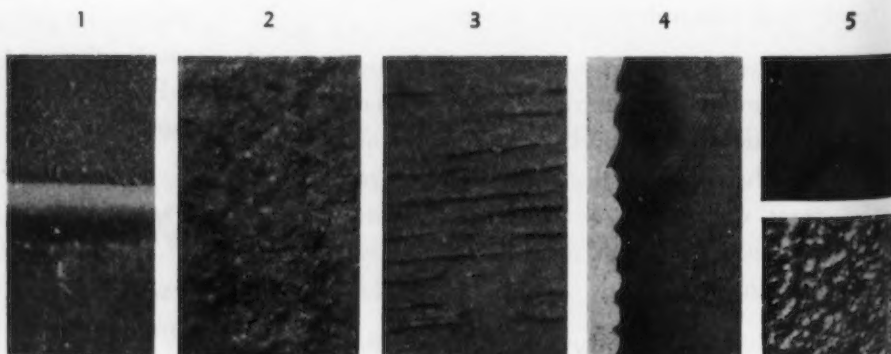


Fig. 2—Several materials showing a variety of surface conditions. (1-Bottom) Naturally smooth surface of aluminum; (1-Top) same surface after sand blasting; (2) naturally rough surface of gray iron; (3) naturally rough surface of boxwood; (4) cross-section of a sand-blasted iron plate; (5-Bottom) iron plate after immersion in H_2SO_4 as compared with plate before treatment in (5-Top). Materials 1, 2, 3 and 5 at 6.5 diameters, and 4 at 55 diameters.

Sprayed Metals

By T. W. LIPPERT

is heavy, and the additional weight of the molten metal in the reservoir makes it a much more cumbersome piece of apparatus to handle than the Schoop wire pistol. However, a greater speed of operation, as well as superior control of spraying temperature, is claimed for the Mellozing process. This latter fact is of paramount importance, as the quality of sprayed coatings is greatly influenced by the nozzle temperature of the metal, and a very narrow temperature range results in optimum coatings. For tin the metal temperature should be about 30 C. deg. above the melting point, and for zinc it should be about 50 C. deg. above the melting point.

A third type of pistol was developed around 1919 by Van Winsen, of Holland, for a Japanese concern. This pistol melts the metal electrically, and it was used in the Orient where oxygen and acetylene were not always available. Its operation is entirely satisfactory, but because of economic considerations its worth is doubtful in places where the gases can be secured.

So much for the history of the process and the various types of pistols in use today. By one method or another practically any metal can be reduced to a liquid form and sprayed on practically any type of surface. Zinc, tin and copper are in common

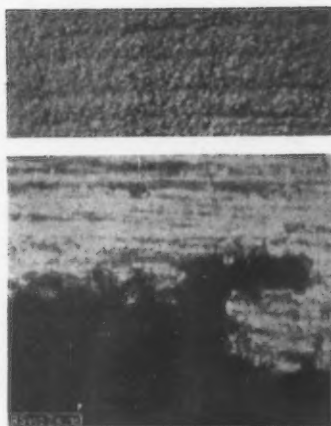


Fig. 3—(Above): Bronze sprayed on the boxwood shown in (3) of Fig. 2. The bronze enters the wood pores as shown in the cross-section (below). Dark part is wood and light part is bronze. Taken at 50 diameters.

usage for metal protection. Lead has some applications but there are dangers of poisoning during the spraying process. Aluminum is widely used for coating parts subjected to heat, salt water spray or atmospheric corrosion. Monel metal and stainless steel have found a place in building up worn machine parts and surfacing high-finish rolls.

In all cases the molten metal issues from the pistol nozzle in the form of a fine cloud in which the individual particles vary in diameter

from 0.0004 to 0.0006 in., depending on the metal being sprayed and the position and kind of flame which is used. The minuteness of these particles may be better visualized by comparing them with ordinary fog particles which average in diameter around 0.00125 in.

The fine droplets of metal are urged forward by the air blast at velocities which vary from 300 miles an hour on up to about 760 miles an hour, depending on the type of blast used and on the metal being sprayed. The average of these velocities is of the same order as the muzzle velocity of a low-powered rifle bullet. Of course the kinetic energies of these small particles are very small, but at a distance of 5 in. the velocity is sufficiently rapid to result in a complete flattening of the particle when it strikes a surface.

In traveling through the air the particles are streamlined in shape. They may not be molten, due to the cooling action of the air, but they are more than likely in a definitely plastic condition, especially in the case of metals having a high heat content. On meeting a surface, a particular particle is flattened out into a saucer-shaped disk with ragged edges as shown in Fig. 1. In this illustration can be seen several copper particles after impact on a glass plate. The mean diameter of each particle shown in Fig. 1 is about 0.033 in., and the thickness averages close to 7×10^{-5} in. Therefore it is evident that the individual particles of sprayed copper are extraordinarily thin and, as compared with atomic copper crystals, each particle averages about 100 crystals in thickness. Metal-sprayed coatings, therefore, are built up of a countless number of these saucer-shaped particles, and they consequently test stronger in one direction than at right angles to it. On a chemically clean and well roughened surface the average adherence of the coating to the base is about seven tons per sq. in. in a pull normal to the surface, according to Turner and Ballard.

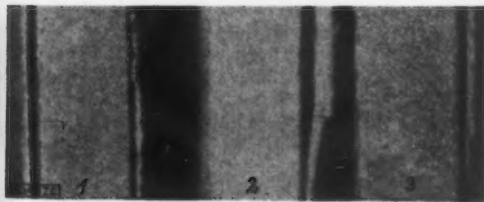
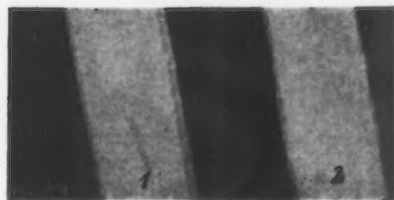


Fig. 4—Cross-section of a smooth Al sheet sprayed (1) with Ni, (2) with Sn, and (3) with Pb. All coatings have separated from the sheet following a heating. Taken at 7.5 diameters.



CROSS-SECTION of a sand-blasted Al sheet sprayed (1) with Sn and (2) with Pb. Coatings adhere even after heating at 150 deg. C. for 3 hr. At 6 diameters.

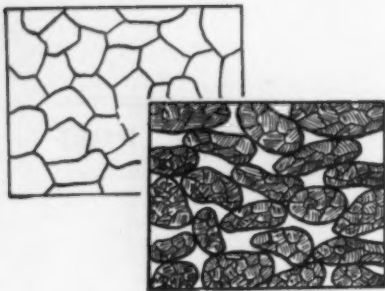


Fig. 5—(Above): The solid crystal arrangement in a casting, as compared (below) with the loose unhomogeneous piling of sprayed particles.

The most natural question to ask would be: "Why do the individual particles stick to the base metal being sprayed?" Naturally there is no alloying at the junction, as the nozzle temperature of the spray metal is far below an alloying level. Therefore the bond is purely mechanical in nature and consists of simple interlocking of each spray particle and the base metal.

How the metal is bound to the base is clearly shown in Fig. 3, wherein sprayed bronze is shown in intimate contact with boxwood. The actual coating process is, however, not as simple as the cross-sectional view would seem to indicate. In many

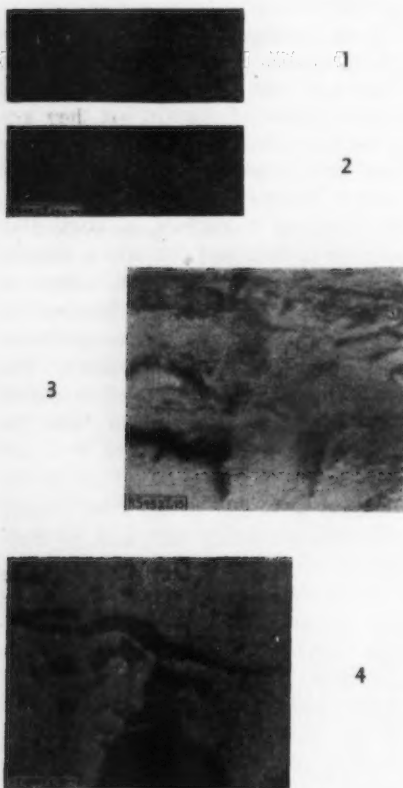


Fig. 6—Sand-like structure of sprayed Ni (1) compared with sifted slag sand (2), both at 5 diameters. Heaped-up structure of sprayed Al (3) and Ni (4), both unetched at 340 diameters.

cases a certain metal will not show maximum adherence to another substance unless a priming coat of another metal is first applied. The boxwood in Fig. 3, for maximum adhesion, should be first sprayed very lightly with tin, then more heavily with zinc, and finally a thick bronze layer can be applied. With respect to the usefulness of priming coats, metal spraying is similar to some processes in electro-plating.

As the metal bond is not one of cohesion or alloying, it is only logical to so roughen a surface that it presents a maximum amount of area to which the spray metal can adhere as well as to furnish small crevices or "key-fasts" by which the spray particles can lock themselves firmly to a surface. In addition the surface must be dry as well as chemically clean. The realization of these factors determines almost wholly the success or failure of metal spraying.

The most common method of roughening smooth surfaces is by means of blasting with special hard sand of about 20-mesh grade or angular steel shot of similar mesh. In Germany the same effect is often secured by treating with about a 4 per cent solution of H_2SO_4 or some similar etching liquid. In all cases the spraying should immediately follow the cleaning in order to forestall surface contamination due to the action of the air. Naturally porous materials such as cement, wood and plaster require no treatment other than the removal of all foreign matter from the surface and a complete drying. In Fig. 2 there are shown a variety of materials which well illustrate the importance of surface treatment. The sand blasting of aluminum results in a decided and almost necessary improvement, and an iron plate is also shown before and after preparation with H_2SO_4 .

In order to demonstrate the necessity of surface preparation a number of experiments were made, and the results are shown in Fig. 4. Smooth aluminum sheets were coated with Ni, Sn, and Pb respectively, after which they were immersed in machine oil at 150 deg. C. for 3 hr. Fig. 4 clearly illustrates how the metals separated from the Al sheets. However, when sand-blasted Al sheets were coated and subjected to the same oil cycle there was no change in the contact positions as shown in Fig. 4.

Nevertheless a surface might be well blasted and still give poor adhesion if it is not also chemically clean. This is a factor which is often ignored by tyros. For instance, it is often almost impossible to completely cleanse some types of used equipment.

One foundry company found that a cast iron tallow pot practically defied complete cleaning, and in another case a mercerizer continued to seep sulphur after many cleaning attempts. In neither case did the spray metal adhere satisfactorily. Like problems would probably arise in any metal spraying shop.

The mechanism by which the spray particles adhere to a surface has been described, but the interlocking of particle with particle is somewhat more complex. In Fig. 1 there are shown several single particles, and if the spraying had continued these individual disks would have piled up into a moderately compact mass as shown



Fig. 7—Sprayed Zn, showing outlines of single particles flattened by impact. Etched in 2 per cent muriatic acid at 340 diameters.

in Fig. 7. However, the structure is typically of a heaped-up nature, and according to Reininger it can be compared to sand in a bucket in which every space is not filled as in the case of a liquid. Such an arrangement is shown schematically in Fig. 5. In this case the crystals in castings fill each void whereas the spray particles are comparatively loose with many air spaces inclosed within the mass. The sand-like structure of sprayed metals is directly compared with magnified photographs of sand in Fig. 6. In the same figure are shown Al and Ni sprayed sections in which the heaped structure is discernible.

One might now ask: "Is the bond between sprayed metal particles also purely mechanical in nature or is there actual cohesion?" There is considerable divergence of opinion as to whether the spray particles retain at least a goodly part of their heat prior to impact with the surface. Microscopic examinations of lead and tin, which have low melting points, have shown that there is often actual fusion of particle with particle.

Nevertheless a temperature necessary for fusion is seemingly belied by the fact that metal can be sprayed on to fine silk or tissue paper without injury, guncotton can be coated without exploding, and the palm of the hand can be held 6 or 7 in. from the pistol nozzle without discomfort.

This would seem to indicate then that in the case of sprayed zinc the temperature has dropped from 420 deg. C. at the nozzle to about 50 deg. C. at the hand. This temperature drop could be logically attributed to the passage of the finely divided particles through the low-temperature air. However, the particles on impact must be above 50 deg. C. to account for apparent fusion. Turner and Budgen are of the opinion that the par-

for aluminum. It was subsequently determined that the velocity of sprayed brass is actually only 120 meters per sec. and zinc around 140 meters per sec. Obviously these velocities are insufficient to result in fusion due to an impact temperature rise alone. However, the temperature is undoubtedly elevated somewhat, and that reaction probably adds to the temperature of the particle (which is probably well over the 70 deg. C. as in the test) so that sufficient energy is available to fuse metal particles having a low melting point.

Despite the fusion of particle with particle described above, a sprayed coating is considerably more porous than hot-dip or electro-plated surfaces. Porosity is extremely undesirable and

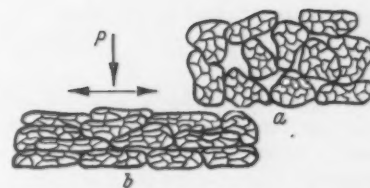


Fig. 8—Loosely arranged particles as sprayed (a) and more compact structure (b) due to treatment with wire brushes.

tained in the pores of the sprayed metal. The elimination of the porous structure by wire brushing is shown again in Fig. 10, and the views in Fig. 11 demonstrate how the brushing also results in better contact with the base material.

Attention has been called to the fact that sprayed metal contains a little oxide. It is of interest to note at what stage the oxidation occurs. Schoop, Arnold and Reininger are of the opinion that oxidation cannot take place during the atomization in the gun. They base their conclusions on the fact that the metal soon stiffens, and there is also little time for oxidation due to the short period of flight, about 0.001 to 0.002 sec., according to Bablik. What is more likely is that oxidation takes place on the freshly deposited surface, as there is no time factor and the oxyhydrate produced by air dampness has considerable opportunity to penetrate the porous metal prior to brushing or solidifying by hammering. In this connection Ballard has pointed out that sprayed brass is unaltered as regards

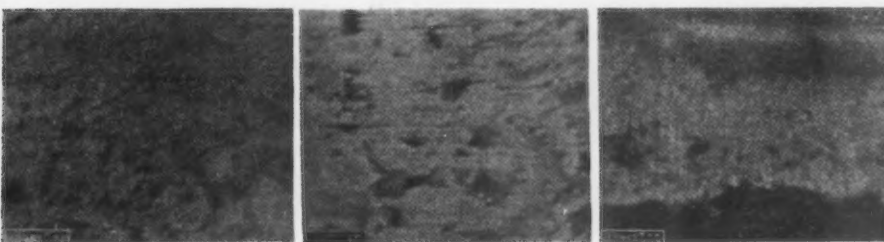


Fig. 9—Sprayed Al, Fe, and Ni surfaces which have been polished with rotating wire brushes. Structure is much less porous than (3) and (4) of Fig. 6. Unetched at 340 diameters.

ticles during their flight remain in a semi-molten condition at a temperature somewhat under 420 deg. C. They attributed the apparent lack of heat content on impact with the hand to the inability of measuring instruments to detect such imponderable heat energies as contained by the finely divided particles.

The above assumption is not particularly far-fetched when one considers that zinc has a specific heat of only 0.09. On this basis, a single zinc spray particle at 420 deg. C. has a heat content of the order of 10^{-7} calories, and it is entirely within reason that such a minute bundle of energy would be imperceptible on contact with the human body which is almost infinitely larger in heat capacity. Therefore it is possible that each spray particle moves within a globule of heated air and at the moment of impact the temperature is near the fusion point.

One other factor has received consideration by Turner and Budgen. That is, on impact the energy exchange might be sufficient to fuse the particles. On assuming an initial temperature of 70 deg. C., it was calculated that the velocity necessary for fusion when the energy of motion is converted into heat would be 327 meters per sec. for lead, 446 for tin, 763 for zinc, 1046 for copper and 1274

may be overcome by mechanical, thermal or chemical means as the particular case may require. After spraying, the metal particles may be consolidated by hammering, wire brushing or blasting with ball shot. Heating in a container or under a flame to give incipient fusion often suits other cases, and this process will be discussed later. Also, in some cases the interstices can be filled by precipitating into them certain insoluble chemical compounds.

In Figs. 8 and 9 there are shown schematically and photographically several primary sprayed coatings with a typical stratified, unhomogeneous irregular texture. The coatings were treated with rotating wire brushes, and the finer textures resulting from the pressure are shown in the same figures. Treatment of surfaces necessitates considerable investigation in order to secure the result desired without tearing or loosening the coating: Reininger is of the opinion that the use of rotating steel wire brushes is preferable, as the pressure can more easily be controlled and the brushes conform well to irregular surfaces. The amount of pressure to be used depends on a number of considerations, such as the thickness of the sprayed surface, the extent of the surface, the kind of base metal, and the amount of gaseous impurities con-



Fig. 10—Porous structure of brass sprayed on iron.



Same specimen after polishing with wire brushes. Both etched in NH_3 . At 340 diameters.

its zinc content, and alloys containing phosphorus still contain phosphorus after deposition.

In some cases the protection afforded by deposited metal can be more greatly enhanced by suitable heat treatment rather than by wire brushing or shot blasting. The usual procedure is to subject the coating to a systematic heat treatment in a neutral gas or use open flames and some form of protective coating for the metal. The result is to melt or soften the sprayed surface, but care must be taken not to oxidize it. The single particles are, therefore, no longer

and elongation stresses. For simple expansion or contraction, the slight give in the interlocking bond is sufficient to take up all the stresses, provided the article is not subjected to extreme or sudden temperature changes. Likewise, the metal coating will not disintegrate under light flexures, but high-degree bends will result in a breaking of the surface. This is shown in Fig. 12. These views taken at about 6 diameters show the type of fractures which occur at the point of maximum stress in an extreme bend. However, for bends of moderate size the sprayed coatings

densified by some type of pressure treatment, the density is still less than the same material when cast or rolled. On the other hand, the hardness of the sprayed metals often exceeds that of the solid metals. The sprayed metal is also slightly more brittle, although it can be filed, turned and milled, but is liable to flake in one direction. When a copper sheet is sprayed with copper and then rolled, the sprayed metal splits into long shreds. That is, it is ductile in one direction but cracks on being subjected to transverse stresses.

Other tests of a more comparative nature have been made in England.

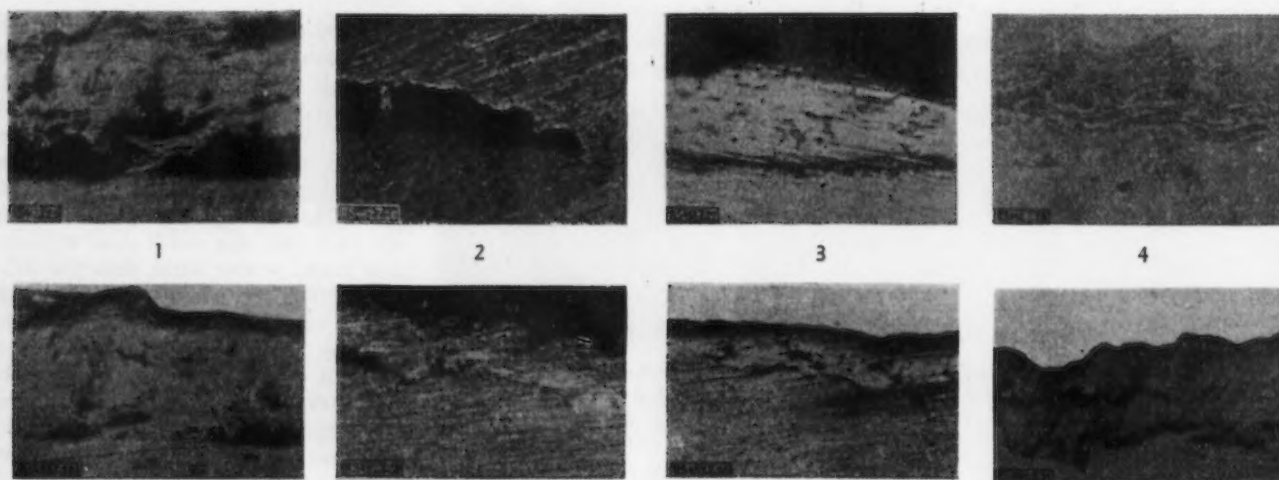


Fig. 11—Cross-sections showing surface contacts of sprayed metals. (Above) (1) Al on Fe, (2) Sn on Al, (3) Fe on Al, and (4) brass on Fe. Contacts in (1) and (2) are not very close, but (3) and (4) are moderately close. (Below) After polishing with wire brushes; (1) Al on Fe, (2) Sn on Al, (3) Fe on Al, and (4) Zn on Fe. Surface contacts in bottom views are much superior to those above. All specimens unetched and magnified 45 times.

just sticking together, but the entire surface becomes a homogeneous mass which is alloyed with the base metal in somewhat the same manner as hot-dip coatings.

The thermal process finds its greatest use in aluminum coatings. Base metals, such as Fe and Cu, alloy with the aluminum as shown in Fig. 14. The entire process consists of spraying a heavy aluminum coating and then aluminizing the surface by heating at 700 to 1000 deg. C. Oxidation is prevented by covering the surface with a brine solution, bitumen or some other special flux. The Fe-Al alloy surface is non-scaling up to 950 deg. C. and has a long life at 1000 deg. C. The actual alloying of the two metals can be seen in the cross-section microphotograph in Fig. 14. This method is now finding considerable application as a means of protecting other metals against high-temperature oxidation.

With regard to the actual strength of a sprayed coating which has been brushed, the inquiry is often made as to its ability to withstand bending

generally stand up as well as average hot-dip coatings.

A great danger in brushing metal coatings is the application of excessive pressures. If the coating is hammered, brushed or ground too severely, the metal crumbles and separates from the base. A microscopic investigation of this weakness is shown in Fig. 13, wherein excessive pressure resulted in the metal separating from the base by 0.09 to 0.15 mm. The splitting off under excessive pressure does not occur uniformly but appears first in isolated sections of the surface. This is explained by Heyn by the theory of hidden elastic tensions. In brief, certain particles are only slightly deformed and have the ability of being additionally deformed under pressure. Between the particles there are hidden elastic tensions when a pressure is applied, and when it is removed the forces act in the direction of least resistance. Sometimes this action works toward greater adhesion in places and a splitting off in other places.

After the coatings have been con-

Similar iron rods were coated, one with sprayed zinc and another by hot galvanization. They were elongated until cracks appeared. The sprayed coating withstood 19 per cent elongation whereas the galvanized coating failed at 11 per cent. Two lengths of 1-in. steel rod were prepared in the same manner and then turned on a lathe. The galvanized coating flaked off when quite thin, but the sprayed zinc was turned down to almost zero thickness without any apparent stripping off. In addition, sprayed zinc coatings can withstand seven immersions in an aqueous solution of copper sulphate without any red copper deposit showing. Likewise a similar coating withstood 10 cycles of 24 hr. each in a mist of salt spray before the first sign of rust appeared.

The above corrosion tests would seem to indicate that well applied sprayed films which have been brushed will withstand penetration by liquids. However the average sprayed coating must be thicker than a hot-dip coating to be equally water-resistant. In order to be wholly satisfactory a sprayed

Fig. 12. metals. compre

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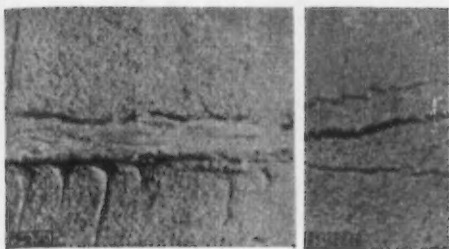
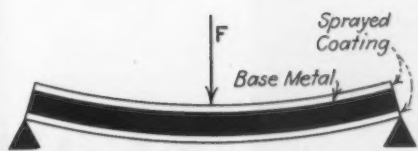


Fig. 12—(Above): Bending test of sprayed metals. (Above left): Sn coating on the compression side, and (above right) the coating on the tension side.

film must be non-porous: Theoretically two coats of lead or tin are sufficient, but for stainless steel it takes eight coats, and for monel, twelve coats. The average thickness of a single coating varies from 0.001 to 0.003 in., depending on the melting point of the metal used. Lead and tin, for example, cover a great deal thicker than the harder metals such as monel and stainless steel. To have complete freedom from pores, Ballard states that a coating at least 0.0025 in. thick is necessary for lead, whereas for metals of higher melting point a coating at least 0.010 in. thick is necessary. Ballard also claims that tin and zinc are practically non-porous as sprayed.

After this review of actual work done on the structure of sprayed metals, it is of interest to note the experimental investigations now under way, as reported by Reininger. A certain amount of heating of a surface prior to spraying is beneficial and experiments are being conducted along this line. Also, German experimenters are studying the effect of tempering coatings in brine baths in order to get a simple, non-expensive method of increasing the homogeneity of sprayed coatings. The amount of pressure to be applied to polishing brushes is being correlated, and a more complete study is under way concerning the relations between the character of sprayed platings and conditions of spraying, such as distance of the pistol nozzle, temperature of vaporization and speed of projection of the particles.

In concluding, it may be stated that metal spraying is only negligibly competitive with established methods of applying protective or ornamental metal coatings. Its cost is obviously greater than standard procedures for ordinary uses, but there are many

special cases in which the spraying gun is the only means of applying a metal coating, and there are other cases where conditions favor its use and make it economical.

Its particular sphere of usefulness is in applying coatings to large objects *in situ* where the object cannot be brought to a stationary plant for galvanizing or electroplating. Again, many objects are too large to be put in a plating-out tank.

For many years the practice of metal spraying in the United States has not had the range of application it has had in European countries, particularly in Germany. In those coun-

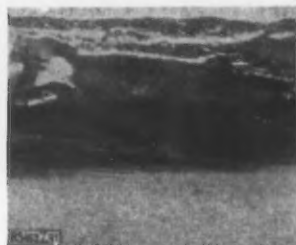


Fig. 13—Cross-section showing the results of too great pressure during polishing. (Above) Ni coating split about 0.15 mm. from Al sheet, and (below) a Fe coating split about 0.09 mm. from an Al sheet. Both specimens unetched and viewed at 45 diameters.

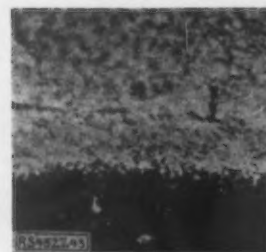


tries many procedures have been established and successful operation has been secured for a number of years. On occasion concerns in the United States have reported that metal spraying has not entirely ful-



Fig. 14 — (Right) Al coated Fe after heating. Dark section is pure iron with gradations upward to pure Al.

(Left) Aluminized iron. Lower part is Al-rich and upper part is Fe-rich. Etched in HNO_3 . Taken at 33 diameters.



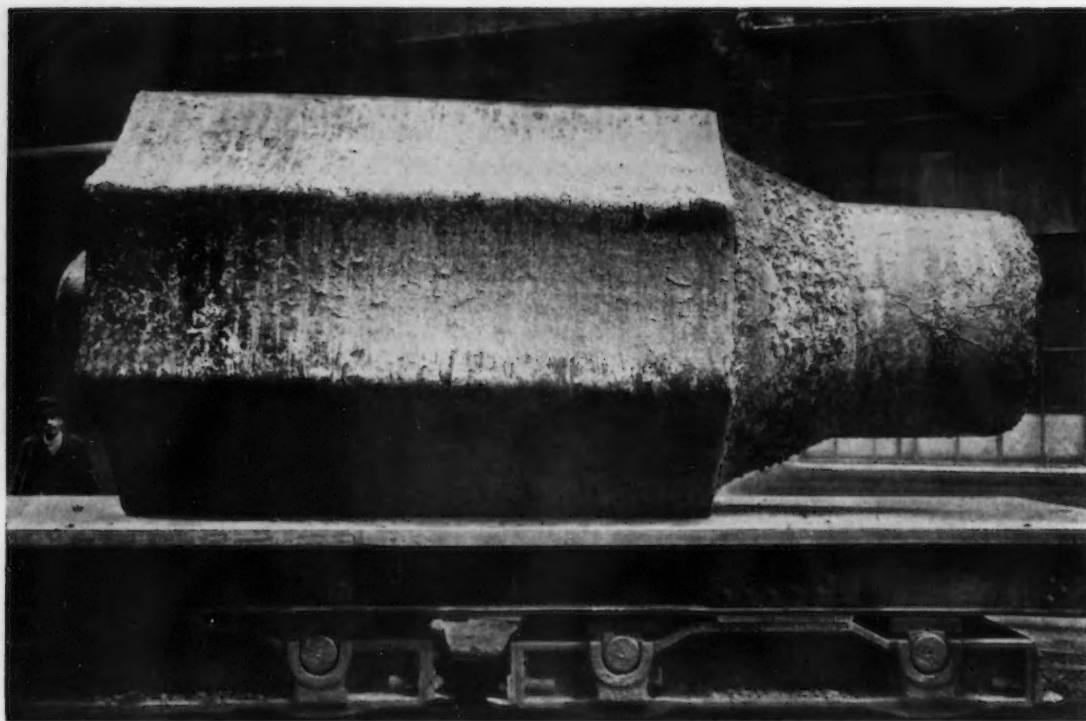
Record World Consumption of Tin

CONSUMPTION of tin by the tin-plate industry throughout the world amounted to 55,000 tons in the year ended last May, the highest total recorded for a similar period, according to advices received in the Commerce Department. This, it is pointed out, is 5000 tons more than in 1929 and 2800 tons in excess of the peak year 1933.

World consumption of tin during the 1933-34 period amounted to 129,600 tons against 101,765 tons in the corresponding period immediately preceding. The United States increased its consumption of tin from 38,470 tons in the 12 months ended May, 1934, to 58,117 tons in the 1933-34 period, while British consumption advanced from 17,879 tons to 20,112 tons.

Consumption of tin by the world's motor car industry during the first five months of the current year reached a total of 5700 tons, compared with 3590 tons in the corresponding period of 1933.

The figures cited above are from the July bulletin of The Hague office of the International Tin Research and Development Council, the report points out.



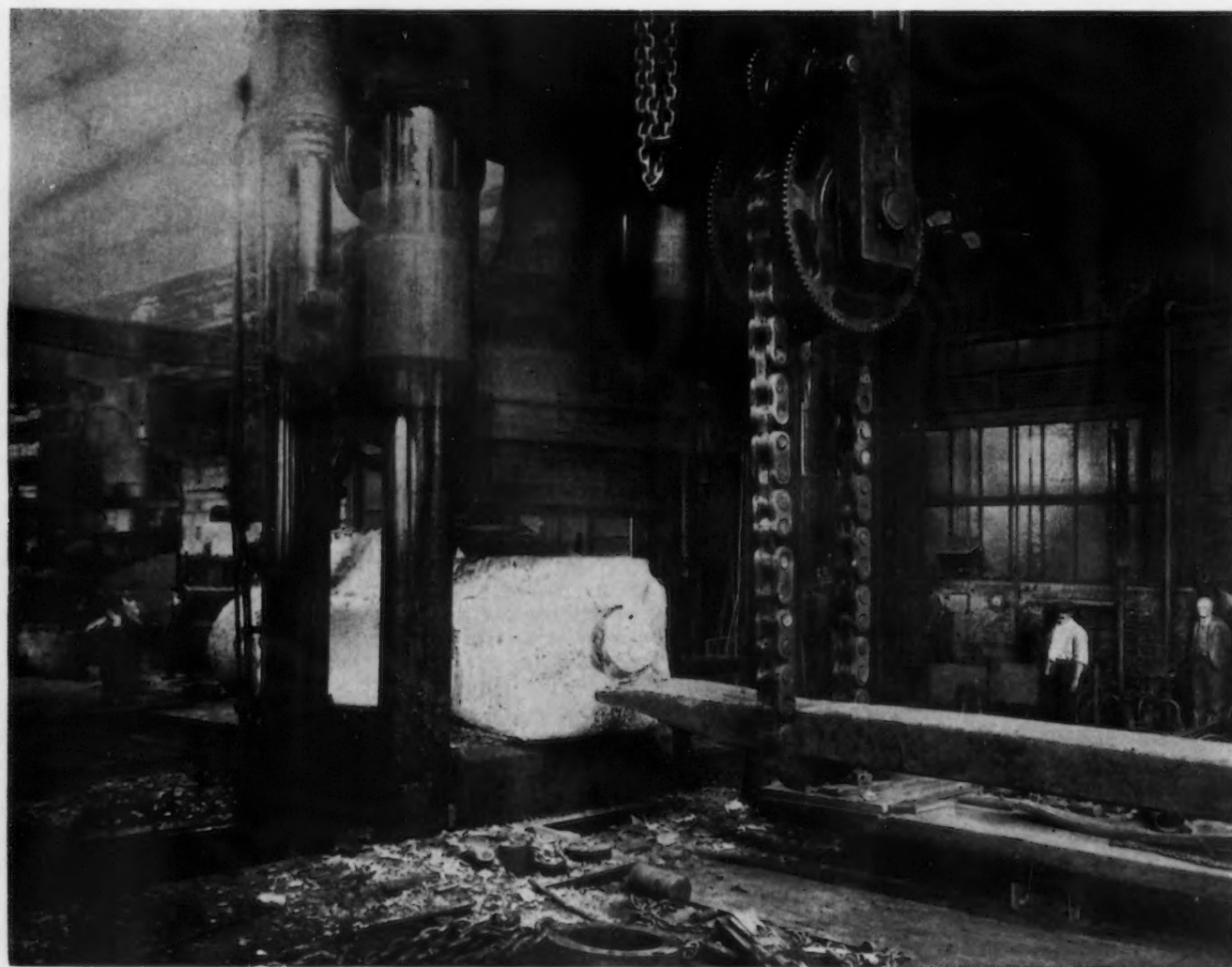
Metals

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Rough steel ingot for disk for a 13-ft. rotor for stabilizer in the "Conte di Savoia."

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The ingot is gradually formed into a round, with discards taken from time to time.



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als for Gyroscope Rotors ▲ ▲ ▲

By EDWIN F. CONE

SHIP stabilizers in the form of gyroscopes were first developed about 25 years ago. Both in metallurgy and in physics, they have presented many and difficult problems as regards construction and operation. Meanwhile use of the apparatus has rapidly expanded, especially in recent years. Vessels large and small now have stabilizers and gyroscopic compasses, and airplanes own the equipment, particularly in the form of automatic pilots, which have recently created some sensation. Wiley Post, in his phenomenal airplane trip around the world, used the first automatic pilot ever made.

In every type of gyroscopic apparatus, metals are used to an extent little dreamed of by the average individual. And the variety of metals and alloys employed for numerous parts is extensive. Not less than 16 different metals enter into the construction of a gyrocompass. Very exacting are the conditions under which these metals and alloys are used and hence their properties and conditions must be guaranteed to the nth power of perfection. One of the vital parts of each type of gyroscopic apparatus is the metal rotor, or wheel, of the gyroscope itself. This must travel at a high rate of speed ranging from 910 revolutions per minute in the largest ship stabilizers and 930 r.p.m. in a 5600-ton yacht to 14,000 r.p.m. in some of the smaller gyroscopes in other applications.

The metal which is incorporated in the rotors, which is the main spring or vital part of a gyroscope, no matter what the size, is determined largely by the size of the gyroscopic apparatus in which it is to function—large ship stabilizers, smaller vessel stabilizers or gyros, gyroscopic compasses, automatic pilots, and so on.

In general there are four classes of material of which the rotors are made: plain carbon steel, alloy steel, manganese bronze, and brass. The rotors range in size from the largest of 246,000 lb. to the smallest of a number of ounces. It is essential to emphasize at this point that, no mat-

ter what material is used, the rotor metal must be brought to the highest possible state of uniformity as to density, strength, composition and so forth, because a mass of metal, whether large or small, traveling at the speeds at which they are called on to operate, might otherwise fly apart or run in an unbalanced state. Perfect balance at the speed of revolu-

LARGE size, homogeneity of metal, dynamic and static balancing, precision in assembly, such as bringing bolts to identical tension—these are some of the problems of making the rotating elements for stabilizing gyroscopes, such as are used for steadying ships. Some sixteen different metals enter into the construction of a gyrocompass.

tion is a *sine qua non*—and this is secured only after extreme care. Both forgings and castings are, or have been, used for these rotors and so the metallurgical problems involved to insure what may be regarded as nearly absolute uniformity in the metal are many.

The largest rotors are installed in such vessels as transatlantic liners and large ocean-going yachts. The most illustrious case is the Conte di Savoia of the Italian Line, a 41,600 ton ship. In this vessel there are three stabilizers. Each one contains a large rotor, 13 ft. in diameter and weighing 110 tons, which turns at 800 r.p.m. when operating at normal speed, with a maximum of 910 r.p.m.

The interesting fact about this installation is that three such stabilizers were adopted rather than one which would have required an 18 $\frac{1}{2}$ -ft. rotor to have accomplished the same purpose. But it is today impossible to obtain from the steel companies a forging 18 $\frac{1}{2}$ ft. in diameter which will meet the specifications because,

allowing for all discard and losses, a large enough steel ingot cannot be made.

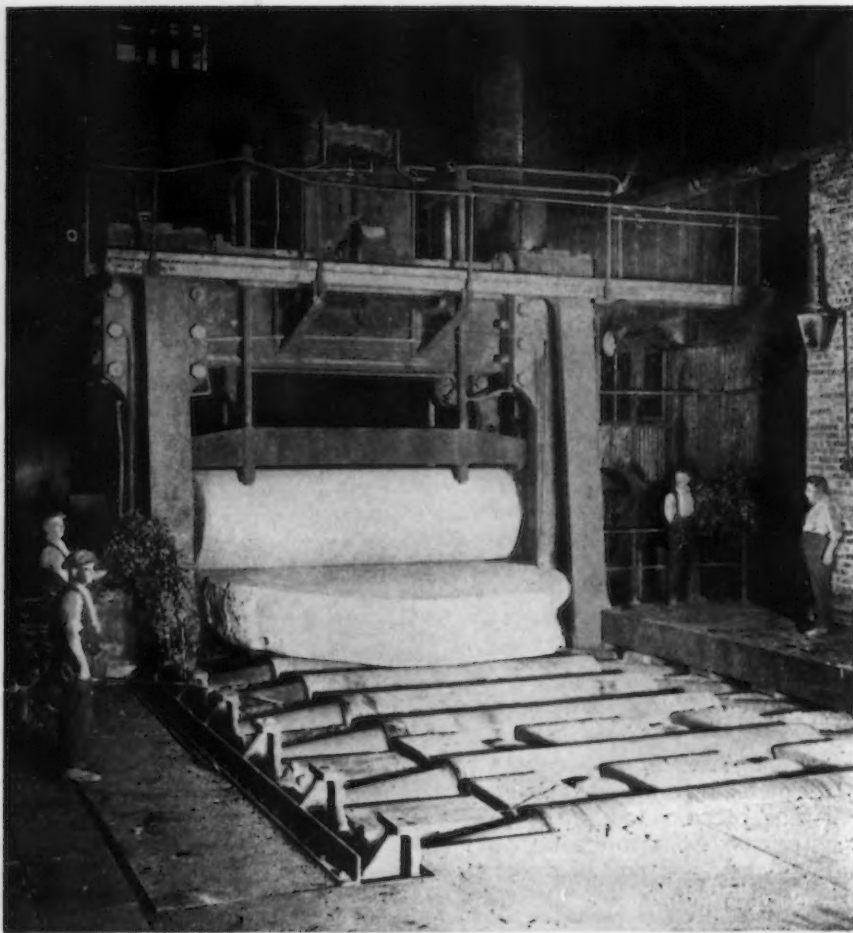
From the largest possible ingot obtainable today a 13-ft. rotor is the best that one could count on, when all specified conditions of discard, machining and forging are fully met. One is not dealing here with an ordinary forging. In the early history of the development of the manufacture of these rotors, steel castings were used but they did not prove so reliable or uniform as forgings. But at just that time, large enough forgings were not to be secured.

To illustrate the methods used in producing these large rotors, the general principles of which are the same for all sizes when made of steel, the details involved in the production of the 13-ft. ones for the Conte di Savoia will be briefly described and illustrated.

A large steel ingot of mild carbon steel is poured in the conventional manner from open-hearth furnaces into an ingot mold with a hot top. These are usually octagon ingots and fluted, as illustrated. The ingot is then put through the usual forging steps, during which unusually heavy discards are made, to retain the soundest metal. After rounding and forming, the metal is rolled into the shape of a disk.

After rough machining, the disk is then heat treated carefully to bring the metal up to its best physical properties. Then it is finished-machined. Counting the discards, the loss from scaling and from machining, not more than 40 to 50 per cent, often less, of the original steel ingot remains in the disk.

The physical properties of the metal measure up to the standard for compositions of this character, properly heat treated: tensile strength ranging from 75,000 to 85,000 lb. per sq. in. with corresponding elastic ratio and normal ductility. But such properties are not the essential characteristics, the factor of safety in this respect being ample. Of more vital

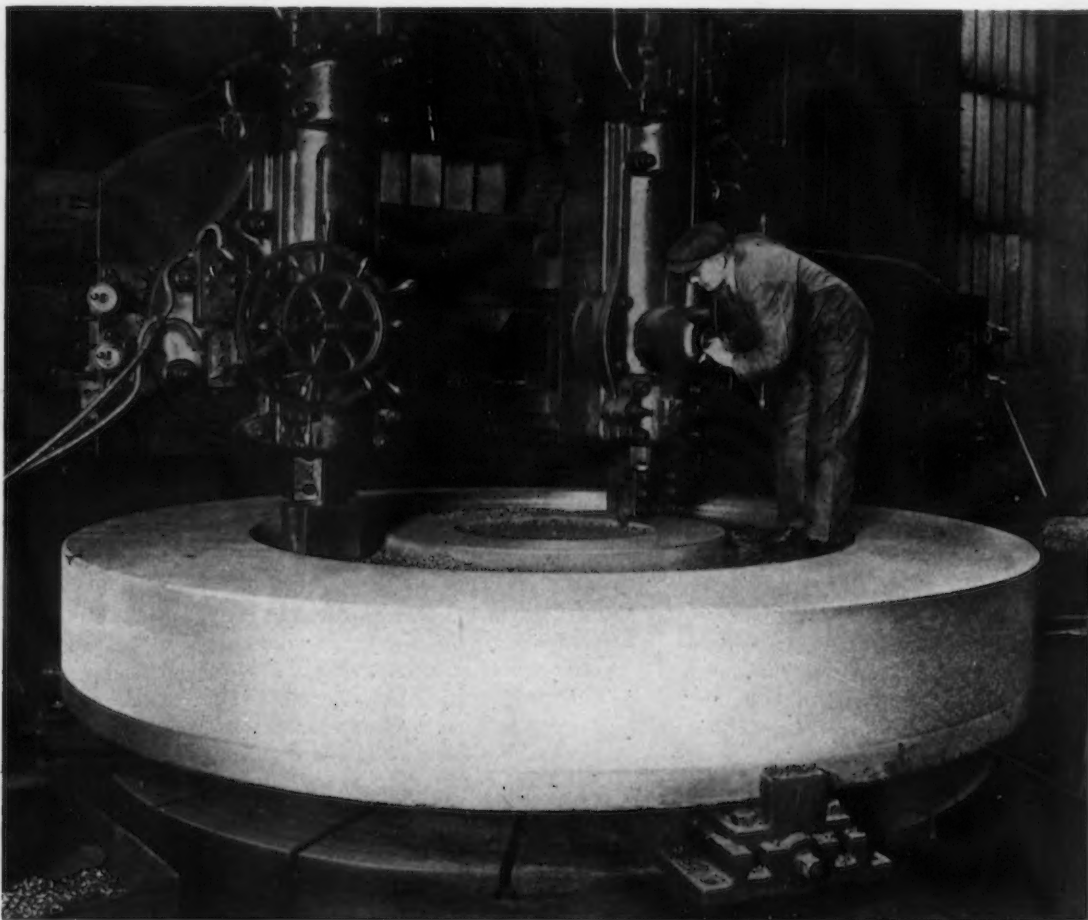


ABOVE

The forging process ends with a rolling of the steel into a rough disk.

AT RIGHT

After rough machining and heat treating, the disk is now undergoing finish machining.



importance is the uniformity of the steel, for a slight variation in this or in the shape seriously affects the equilibrium of the rotor as it revolves at high speeds. This statement applies to all rotors of any metal.

Ship stabilizers as large as the ones for the Conte di Savoia require the joining together of two large disks into one rotor or wheel. Where the stabilizers are smaller, a single disk suffices. In the case of the three rotors for the three stabilizers in the Italian liner, two disks, each about 22½ in. thick (13 ft. in diameter) and weighing 109,000 lb. each, are joined together by a special method devised by the engineers of the Sperry company. (Sperry Gyroscope Co., Inc., Brooklyn.) It is unique in its conception and difficult in its application but these conditions are necessary to insure a final rotor that is dependable.

When Rotor Is Made of Two or More Disks

It is important that the bolts which secure together the various units be tightened to the exact calculated amount and all to the same amount so that the units are held together with the same tension, thus equalizing the stress on each bolt. An ac-

curate method of securing this desired result is by micrometer measurements of the length of the bolt before and after tightening, the lengthening of the bolt furnishing an accurate indication of the stress and furnishing a ready means of equalizing the stress on all the bolts.

The rotor may be made up of two or more disks, which are machined so as to abut only adjacent to the securing bolts. These long bolts which pass completely through the disk assembly are symmetrically placed around the section near the rim and are made so that they are a drive fit to the bore of the bolt holes only at the position of abutment of the disks. There is also placed between the disks, a split ring or key, the purpose of which is to prevent relative displacement of the disks when operating and consequent shearing of the bolts.

For securing the shaft to the rotor, large machine screws are used. They pass through holes bored in the flange of the shaft and are threaded into tapped holes in the rotor. Each of these screws is provided with a small central hole extending through most of its length and into which may be inserted a means of measuring the length of the screw before and after tightening. The gage ordinarily used employs an indicator which measures accurately the depth of the central hole from some base dimension, say the bottom of the screw slot. The procedure is to measure the length of each bore before tightening and then to tighten each screw until it has elongated a predetermined amount calculated to give a certain stress, exceeding the stress that may be placed on the bolt due to operation of the stabilizer.

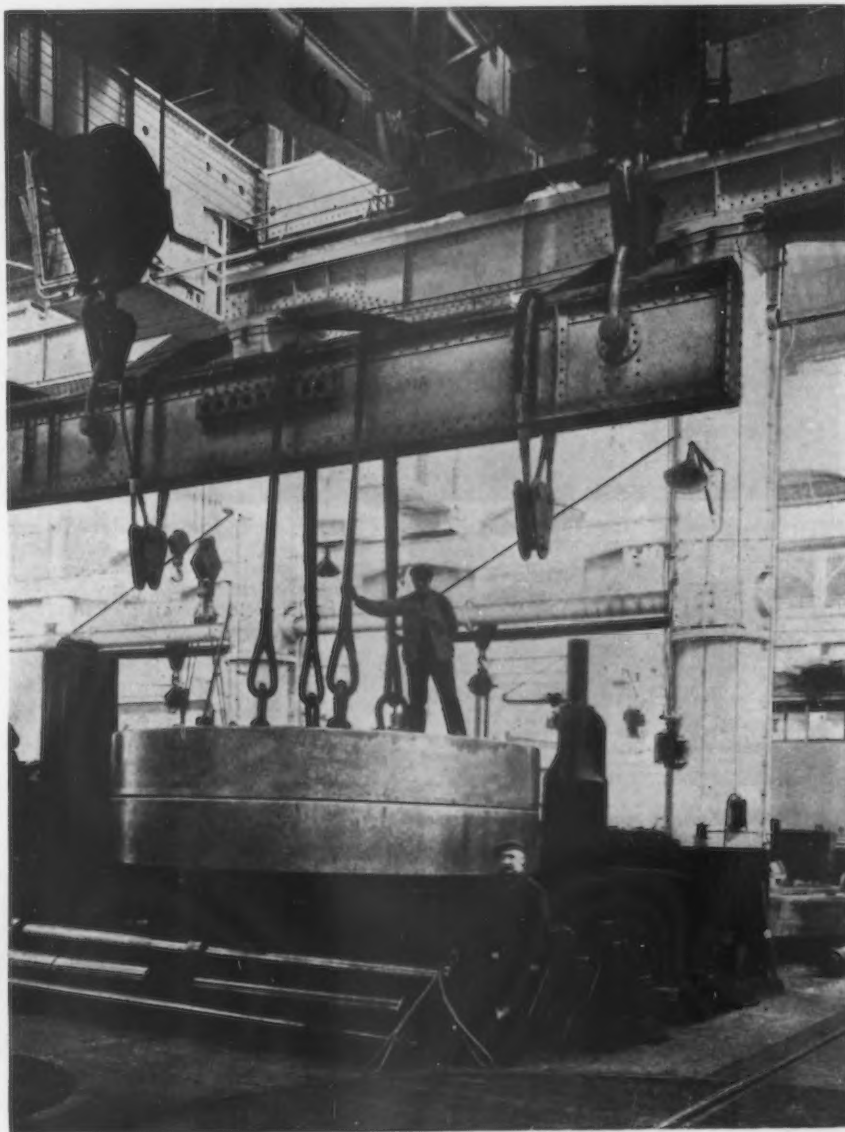
The most important test in the building of a stabilizer or a gyroscope is the determination of its balancing characteristics—that is, whether it is so uniform throughout that it will revolve without vibration or wobbling. One of the illustrations shows the world's largest balancing machine for ascertaining whether a rotor is in dynamic and static balance.

A single 11-ft. disk rotor for the yacht Savarona, is shown under test, which is typical for all such tests. In this case, it was found that to bring the rotor into satisfactory balance, only 46½ oz. of metal on one side and 10 oz. on the other side had to be removed. It was balanced to an accuracy of approximately 0.01 ounce-inch per 1000 lb. of rotor weight. This is eloquent testimony to the uniformity of the steel and the

exactness of the machining. It should be added that, were there any porosity, inclusions or defects in the metal, such balancing would not have been realized and the expensive forging would have had to be rejected. For the small rotors, similar apparatus on a smaller scale is used.

rotor, 109,235 lb.; net loss of metal, 108,765 lb., or 49.8 per cent. Total weight of the stabilizer is 110 gross tons, the vessel having a displacement of 5600 tons.

The Sperry company states that "experience with all stabilizers (on ships) has shown definitely that 90



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The larger rotors are made by assembling two or more disks, with care, to bring all bolts to identical tension and keying to prevent one disk rotating with respect to the other.

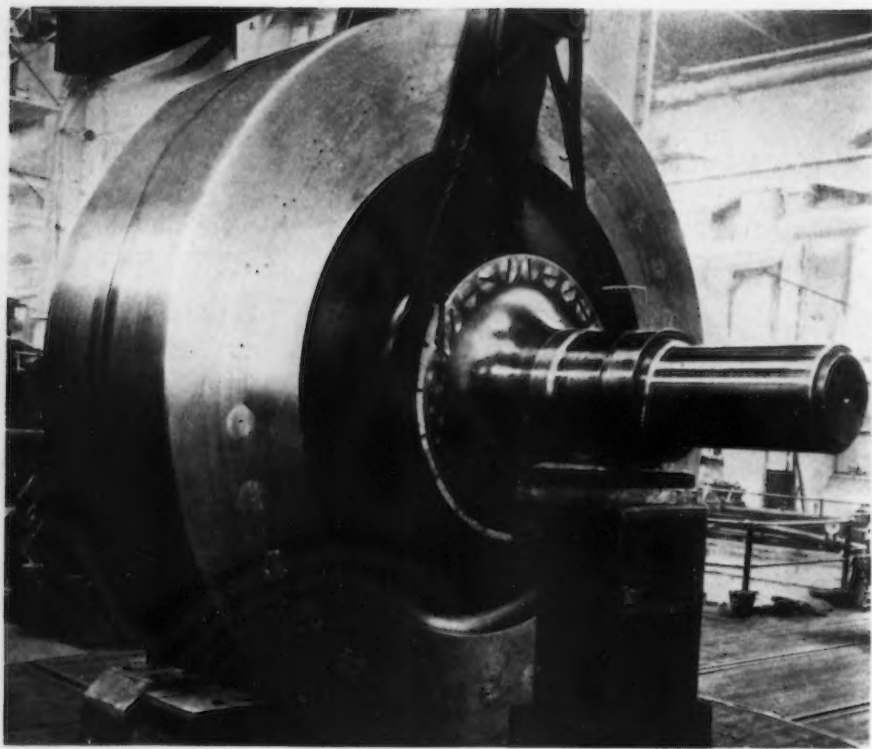
Some idea of the amount of metal involved in the manufacture of the larger steel rotors can be secured from the following facts:

The 13-ft. rotors for the Conte di Savoia: Total weight of original ingot, 256,500 lb.; net weight of finish-machined half section, 109,000 lb.; net loss of metal for both sections in complete rotor, 295,000 lb., or 57.5 per cent.

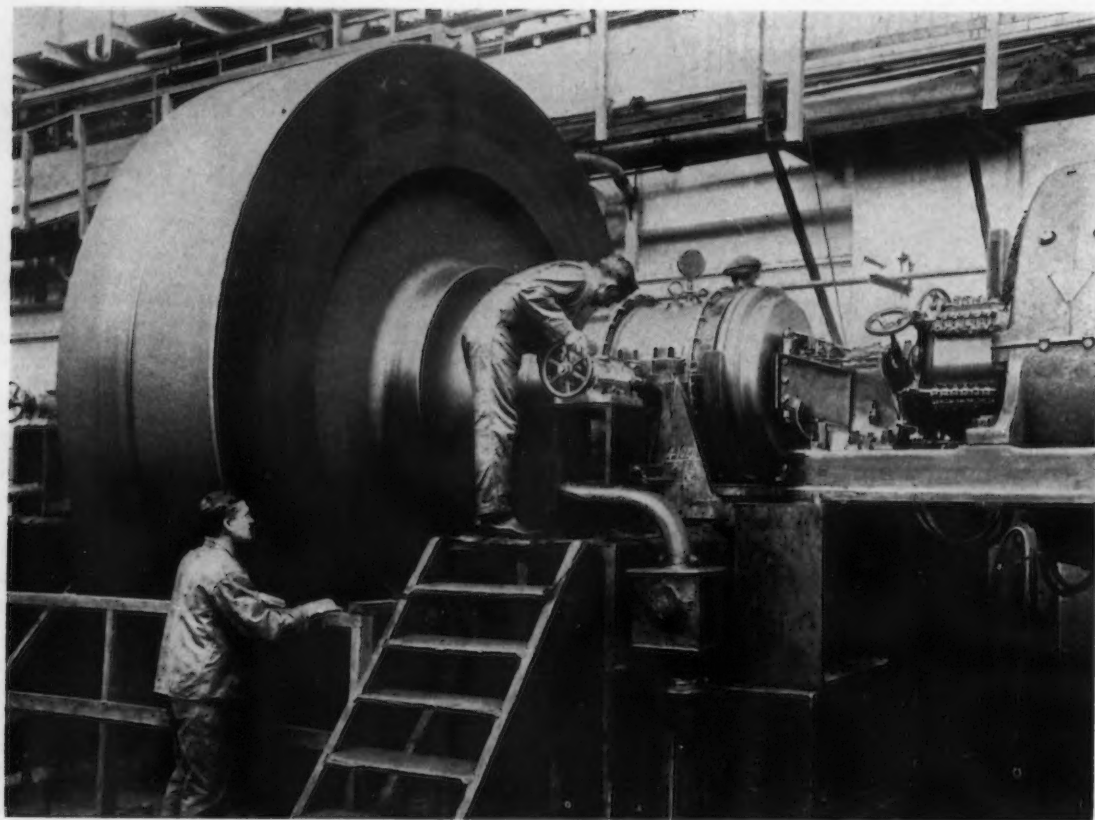
The 11-ft. rotor for the Savarona: Total weight of original ingot, 218,000 lb.; net weight of finish-machined

per cent of the roll is eliminated; that, in general, the larger the vessel, the more efficiently it can be stabilized and that, with vessels of 5000-tons displacement or more, the deck can be held within 3 deg. of the horizontal in the heaviest seas ordinarily encountered."

Besides their incorporation in ocean liners, in large merchant vessels and ocean-going private yachts, they are being used on naval vessels of the United States, Japan and other nations. One Japanese airplane carrier



Bolts unite the shaft stubs to the rotor, as shown by this view of a complete rotor assembly for Conte di Savoia.



has had for eight years a stabilizer equipment slightly smaller than one of the three on the Conte di Savoia. In recent years their use on airplanes has broadened decidedly.

Composition of Rotor Metal

The metal used in various rotors for gyroscopic apparatus is determined by the size of the gyroscope employed. As indicated, a mild plain carbon steel is used in the larger stabilizers. Other metals used are as follows:

Alloy Steels: A nickel-chrome-molybdenum steel forging containing about 2.50 per cent Ni, 0.70 per cent Cr and 0.60 per cent Mo. This steel, after careful processing and heat treatment, has the following properties: Tensile strength, 158,000 lb. per sq. in.; 140,000 lb. per sq. in., yield point; elongation in 2 in., 15.5 per cent; Brinell hardness, 340. Rotors of this alloy steel, after finishing, are initially balanced at a speed of 6000 r.p.m., then given a stretching run of 3 hr. at 12,000 r.p.m. and then finally balanced. These are 12 in. in diameter, 2 in. wide and weigh approximately 45 lb. each. They are used in gyrocompasses.

Vanadium steel forgings of similar properties and dimensions are also used.

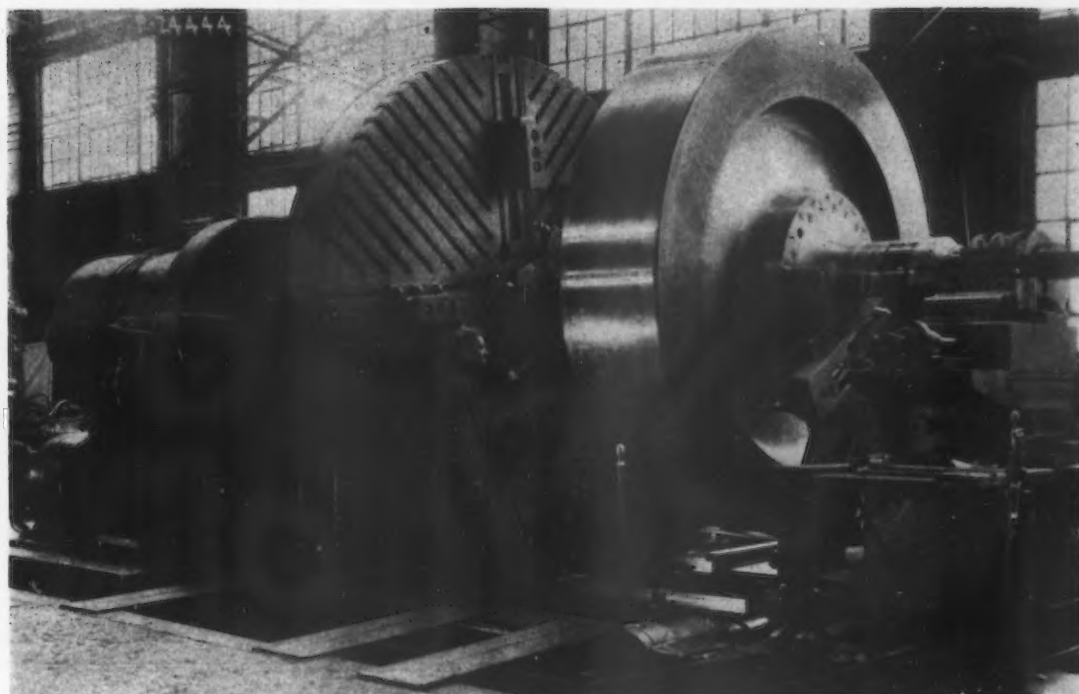
Manganese Bronze: Rotors of this

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In the dynamic balancing, the rotor is placed in bearings supported on live rubber pads which permit oscillations in one plane. The disk is then rotated at a speed identical with the natural period of vibration of the supported mass and the natural period of the rubber. This allows the successive impulses due to the centrifugal forces to give the system a large and measurable amplitude of vibration.

▼ ▼ ▼

Trueness of diameters
and faces are tested
in a large lathe.



material used to be made as castings. In the foundry practice large heads, equalling in most cases the weight of the rotor, were provided to insure as homogeneous a product as possible. They were made in the company's own foundry.

According to present practice, the manganese bronze is purchased as billets, 6 in. in diameter and 48 in. long. These are cut up into four blanks each weighing 80 to 85 lb. These blanks are then forged to the approximate size and shape of the finished rotor. After finish-machining, they are balanced statically and dynamically by special methods. After

being initially balanced at a speed of 5000 r.p.m., a rotor is assembled in a rotor case and given a stretching run at 9000 r.p.m. for 4 hr. It is then replaced in the balancing stand and given the final balance. Such a rotor is 10 in. in diameter and 3 in. wide. It weighs approximately 55 lbs., and is usually incorporated in a gyrocompass. The composition and properties of the manganese bronze are here tabulated.

Brass is also a rotor metal. The conventional product is used. But in the preparation of the rotors, the same care is adhered to, to establish substantially absolute uniformity.

Manganese Bronze for Gyroscope Rotors Chemical Composition:

	Per Cent
Copper	55 to 60
Zinc	38 to 42
Manganese	3.50 max.
Tin	1.50 "
Lead	0.20 "
Aluminum	1.50 "
Iron	0.40 to 2.00 max.
Other elements	0.20 max.

Physical Properties:

Tensile strength, lb. per sq. in.	65,000
Yield point, lb. per sq. in.	30,000
Elongation in 2 in., per cent.	20.0
Reduction of area, per cent.	38.0
Weight per cu. in., lb.	0.3009
Shrinkage per ft., in.	0.25
Brinell hardness	102
Specific gravity	8.34

New York Industry Museum Increasingly Popular

THAT a science museum developed along what may be called modern lines has a strong appeal to the people is indicated in the experience of the New York Museum of Science and Industry. Three aims are held in respect to its exhibits, namely, to make clear the mechanical operation of each apparatus, to set forth the scientific principles involved in the operation, and to suggest the economic and social importance of each division.

The attendance in 1933 was 234,319, and it is pointed out by Frederic B. Platt, president of the museum, that this figure represents 58 per cent of the number of visitors to the famous Deutsches Museum in Munich in the year 1932-33. Yet the display space is only one-twelfth of that of the

Deutsches Museum. In addition to the exhibits portraying the evolution of basic industries and utilities, sound and silent motion pictures on scientific and industrial subjects are commonly shown every noon hour and in afternoons except Sunday, and a reference library devoted to invention and industrial progress is maintained.

The museum occupies the fourth floor of the Daily News Building, 220 East Forty-second Street, New York, with some 30,000 sq. ft. of floor space. It is handicapped by the fact that there is no direct entrance from the street level, as in the case with a public institution of its character. Its present status is owing largely to funds bequeathed by Henry R. Towne, head of the Yale & Towne Mfg. Co.,

and it has been helped also by the Carnegie and New York Foundations. It needs municipal and general public help, particularly in the shape of a building well located and large enough to serve the needs.

In spite of the times, important exhibits were added in 1933 to the permanent displays. Among these, Dr. Charles R. Richards, executive vice-president of the museum, reports the following: Railroad air brake apparatus donated in part by the Westinghouse Air Brake Co.; a gear cutter and shaper placed in automatic cutting operation at regular, clock-controlled intervals; an operating and illuminated model showing the action at each stroke of a four-cycle internal combustion engine; a pictorial representation of an electric power system showing its use in industrial applications.



A modified watt-hour meter, besides measuring the energy taken from the power feeders, sends impulses to a recording demand meter, which in turn, on a predetermined value being reached, serves to stop the pushers at the rolling mills.

THE limitation of power demand is a subject of vital interest to practically all plant managers who buy power from a central station. It is very easy for an industrial plant to pile up heavy irregular power requirements, creating abnormal needs for energy entirely out of proportion to the average demand.

Central stations are required by industry to have available sufficient generating capacity to meet the maximum demand at all times, even though they may be actually called upon to deliver energy for high peaks during a comparatively short time. Since the central stations have a certain percentage of their available generating capacity tied up to meet excessive peak loads, it has been the practice in many cases to charge their customers not only for the actual power used, but in addition for the demand. In spite of this demand charge the central stations are anxious to cooperate with the industrial plants in reducing the demand because their equipment can be utilized more advantageously if operated somewhere near continuous capacity than if merely held in readiness to meet a possible peak.

Power demand can be reduced by careful planning of production. It

can also be controlled automatically by a number of different types of equipment on the market today.

The manner in which the Riverdale, Ill., plant of the Acme Steel Co. limited its power demand charge is of considerable interest. They found that by staggering the operation of their mills they could reduce the power peaks materially. However, since their production necessitated the overlapping of the mills, they invariably had high peaks.

Control on 30-Min. Intervals

A further study was made and it was found that the demand, which is based on 30-min. intervals, could be automatically controlled by installing demand limiting equipment consisting of a totalizing impulse sender, and impulse receiver or recording demand meter and various relays.

The impulse sender is a modified watt-hour meter and serves two purposes. First, it measures correctly the energy taken from the feeders and, second, it sends impulses to the impulse-operated recording demand meter. The sender is equipped with a three-wire contact mechanism that generates the impulses which are sent to the receiver.

The receiver totalizes the impulses from the sender. It is a recording demand meter with the electrical element replaced by a notching relay which actuates the gear train and advances the gearing a definite distance for each impulse. It has a pen reset solenoid and adjustable alarm contacts.

A standard reversing relay, such as used in an automatic telephone system, makes certain by means of an interlocking device that only one

impulse will reach the receiver for each impulse started out by the sender. This relay also has a function of directly operating the notching relay in the receiver, transferring directly to it the impulses received from the sender.

When a demand reaches a predetermined value the alarm contact on the receiver, or impulse recording demand meter, closes and energizes the operating coils on the MC relays. The MC relays each have four contacts, one of which has three normally closed and one normally open while the other has four normally closed. When the coils of the MC relays are energized, seven contacts are open and one is closed.

Shuts Down Pushers at Rolling Mills

The open contacts break the control circuit of the pushers at both No. 2 and No. 3 continuous hot strip mills, and thus the mills run idle. The circuit that is closed energizes indicating lamps at various points throughout the mill to give warning that additional load is not to be thrown on the line during this period. There is also an attachment for a graphic wattmeter to give graphic indications on just when and for how long a period shutdowns occur. The operating coil on the attachment is in parallel with the indicating lamps.

By comparing the accompanying charts A and B it can be determined just when the shutdown periods occurred and for how long. Chart A is taken from an actual record as recorded by the receiver, while chart B is drawn by the attachment on the graphic wattmeter. By referring to chart B and measuring the notches it can be seen that the predetermined demand was reached and the mills

Limiting the Power

By W. J. MAYTHAM, JR.
Westinghouse Electric & Mfg. Co., Chicago

Demand Charge

at the Acme Steel Plant

were running idle for 3 min. at 7 o'clock, 1 min. at 8 o'clock and for 3 min. at 9 and 9.30, etc.

When in any 30-min. period the demand reaches a predetermined value, the alarm contact closes and stays in this position for the remaining portion of the period. The receiver is reset at the end of each 30-min. period by the utility company's master clock.

By having the receiver located at a convenient point the operator knows how fast the predetermined demand setting is being approached, and if approaching too fast can slow down the pushers, thus reducing the load on the mills. Having a record of just how long and how often the mills were

shut down enables the management to strike an economic balance between production and power demand.

Urges Statistical Methods For Steel Plant Problems

THE use of statistical methods in the steel plant was discussed at some length by W. C. Chancellor, superintendent, metallurgical department, Lorain Works, National Tube Co., Lorain, Ohio, in a paper contributed to the American Society for Testing Materials. There is a general tendency in speaking of steel plant problems, he said, to deal with averages, in the face of the fact that the variation over and under the averages

constitutes the real source of difficulties.

The value of tolerances or limits of acceptability, he went on to say, is generally recognized with manufactured parts and products, and he could see no reason why similar tolerances or standard limits should not be intelligently placed on intermediate processes and factors of importance in those processes. The casting temperature in the open-hearth, for example, may be an important factor in quality of product; if so, then limits of permissible variation should be set and efforts concentrated on reducing the number of heats outside those limits. Such standard limits, he contended, are best determined by statistical methods, and he offered his paper to show how the statistical methods may be utilized.

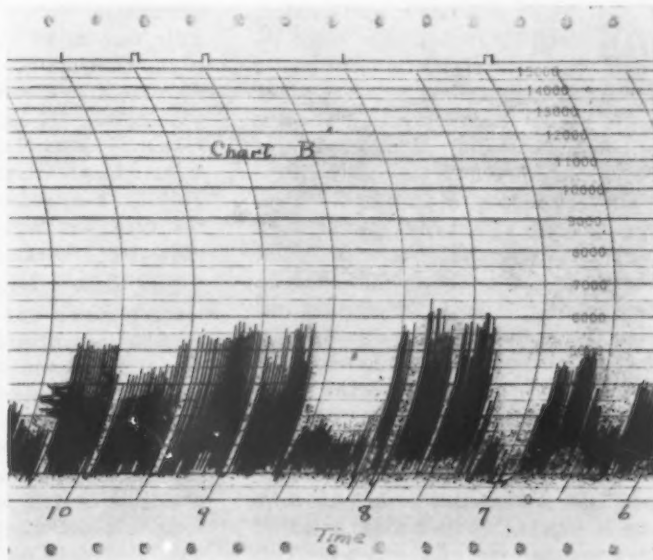
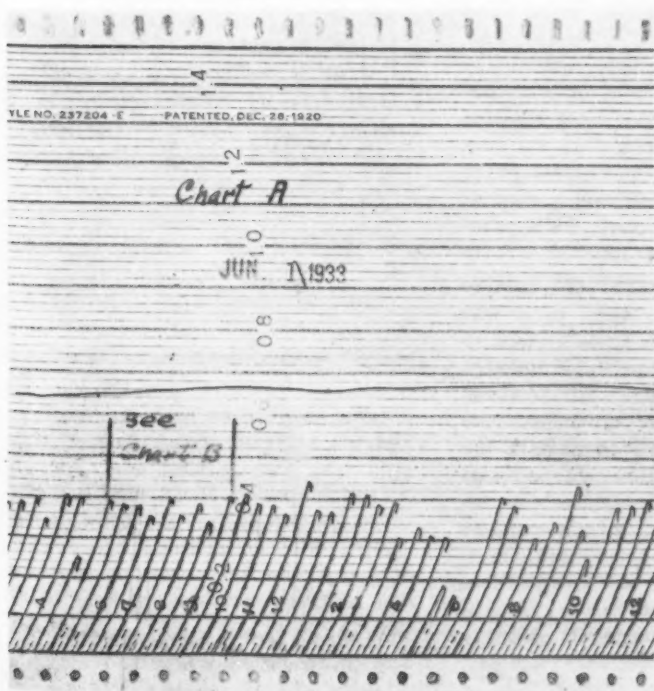


Chart A is an actual recording of the receiver, while chart B is drawn by the attachment on the graphic wattmeter.

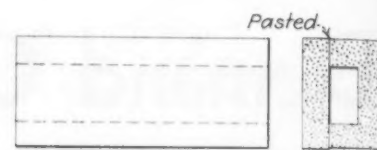
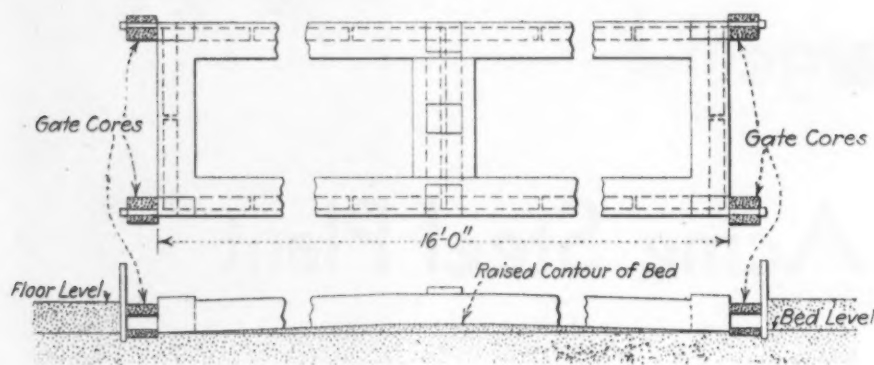


Fig. 2—Gate cores may be made of various sizes by altering piece in core box which forms slot, or, by pasting two dished out units together, capacity may be doubled.

Fig. 1—(At left), Machine frame pattern in plan and section laid on convex bed to provide necessary camber.

Allowing for Camber on Long

MACHINE tool makers and foundrymen whose lines include numbers of very long castings, such as lathe or planer beds, builders' and ornamental iron work, are familiar with the tendency to distortion shown while contraction is in progress and, in the light of much experience, are able to take reasonably accurate steps to counteract it.

For example, a cotton mill building of sawtoothed roof design may require, say, 100 cast iron rain gutter castings approximately 20 ft. long each. The same formula, varying slightly, according to thickness of section and depth of the side walls, is observed on most orders received for castings of this type. A straight skeleton master pattern, with double contraction allowance, is first made. One casting is molded of skeleton design, each end of the pattern being forced down about $1\frac{1}{2}$ in. during the "bedding-in" process, and the effect observed after removing the cold casting from the mold.

If the camber allowance has been properly estimated, the skeleton casting is finished up and used as a pattern on the rest of the order. This obviously implies that an increased depth of concavity must be allowed in the first place, in order to obtain the correct result on the second casting, and, provided the analysis of the

metal used is kept uniform, the rest of the order is plain sailing.

Molding Channel Design Machine Frame

In the small jobbing foundry, however, equipped with one crane of small capacity, and possessing no very large flasks, the receipt of an order for a single casting of unusual dimensions is an event calling for a carefully considered plan of action, and, if the contract is to come out on the right side of the ledger, no slips are permissible. A light oblong machine frame of channel design, 16 ft. long, 4 ft. wide, 8 in. deep, and weighing 1600 lb., was ordered from a shop of the type just mentioned, with a request for delivery in four days.

The actual weight of the casting was of minor importance, as it was possible to pour and handle a piece up to around two tons, provided its area was not too extensive, thus making the flask equipment unwieldy. No flask, however, more than half the size necessary to cover the job was available, and it would have cost almost as much money to make one as was received for the single casting ordered. And, above all, there loomed the prospect of a crooked casting being produced if ordinary methods were followed, that is to say, if the metal were poured into a

straight mold made from the straight pattern the customer provided.

As the upper face of the pattern was flat with the exception of seven pads, each 1 in. high, placed one on each corner, and the three others spread over the central cross member, the "cover-core" system of mold-

HERE'S another illustration of a large molding job done in a small foundry, following the story by the same author in the issue of July 5 of the making of a 30-in. cast sheave from a 22-in. pattern. The question of camber arising out of the long light casting required had to be met. No flask was available and cores were used as a

ing was decided on as being possible, and the necessity for a flask of any kind was thus eliminated. For an overall length of 16 ft., and a metal thickness throughout the body of the casting of $\frac{7}{8}$ in., a camber allowance of $\frac{3}{4}$ in. from the center to each end was assumed to be about right.

With an eye to pouring facilities and gate location, a hole 19 ft. long, 6 ft. wide and 18 in. deep was opened



Fig. 3—Plain open frame used to make 30 slab cover cores.

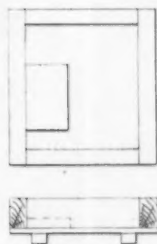


Fig. 4—Core frame fitted with bottom board and thickness piece to form pads.

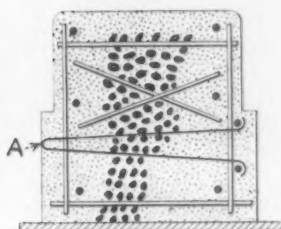


Fig. 5—Body core on plate immediately after withdrawal of box; A is the lifting loop.

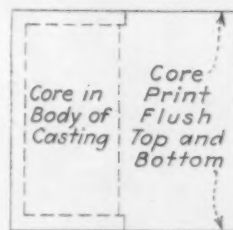


Fig. 6—Pattern as made saved much time in foundry, and eliminated need for chaplets.

Single Casting

By J. H. EASTHAM

up in the floor under the radius of the small jib crane. A few binder plates were set crossways and surmounted by pieces of rails laid longitudinally to minimize the weight necessary to hold down the body and cover cores when pouring. A layer of floor sand was next spread over the

cover instead of a cope. A feature also was the use of coreprints requiring no chaplets. The mold was made the first day and poured the second. On the third day, the iron casting, which was of a 0.80 per cent manganese, was brought to a cherry red heat and stressed by weighting to eradicate inaccuracies not fully compensated for by the mold.

binders and trodden to mold hardness, its upper face being approximately 12 in. below the level of the foundry floor.

Four straight edges, each 4 in. deep, were next leveled transversely in the pit, the distance between the two outer strips being 18 ft., and the space between the two inner ones 2 ft., or, more clearly, each outer strip

was placed 9 ft. from a line drawn across the center of the proposed mold, and each inner strip 1 ft. from the center. After these were all leveled to each other, and rammed up firmly to their upper edges to avoid displacement, a strip of wood $\frac{3}{4}$ in. thick was screwed to the upper edge of each of the two inner pieces only, ramming being then continued until the whole area between the four straight edges was filled.

During this operation facing sand was worked into the area to be covered by the pattern, the face of the bed being afterward struck off in three sections; first, from one outer strip to the nearest inner strip; second, from that inner strip to the other one 2 ft. away, and third, from the second inner strip to the remaining outer one.

This preliminary preparation provided a convex bed, level for 2 ft. in the center, with a downward slope to each end strip of $\frac{3}{4}$ in., on which, when the straight edges had been withdrawn, and the gaps they left tucked full of sand, the pattern was laid, as shown in broken plan and section in Fig. 1. The lightly constructed hollow pattern sagged naturally to the contour of the bed without any compulsion, and the precautions just taken eliminated all danger of a "twisted" casting, owing to the

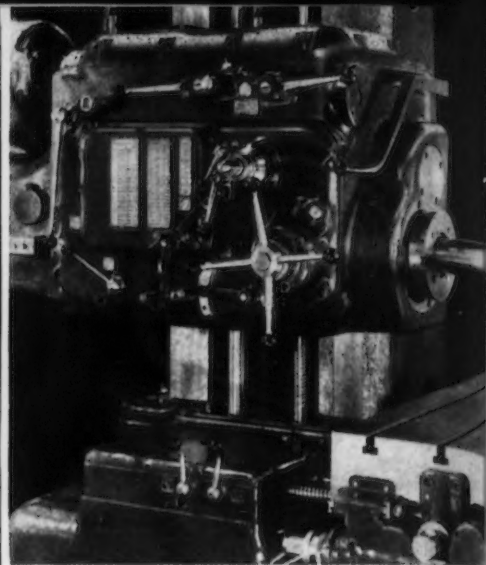
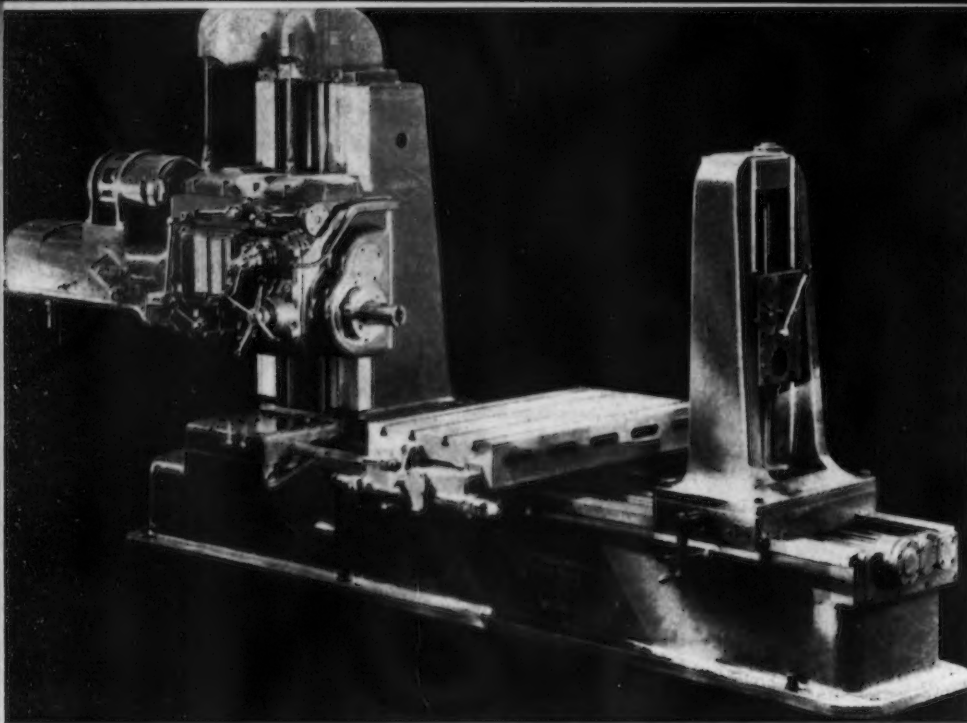
mathematical accuracy of the advance preparation, which, as the ultimate result showed, was fully justified.

The inlet gate cores indicated in both views at Fig. 1 were next set to place, a straight flow for the metal along the side walls of the mold to the center being furnished from a crane ladle at one end, and at the opposite end a 200-lb. shank ladle on each corner. Fig. 2 shows the handy design of gate cores employed on many castings where inlet at the bottom of the mold is desirable, a flat cake core being pasted to a three-sided core, the oblong opening in which may be made of any required size by changing the strip in the bottom of the corebox.

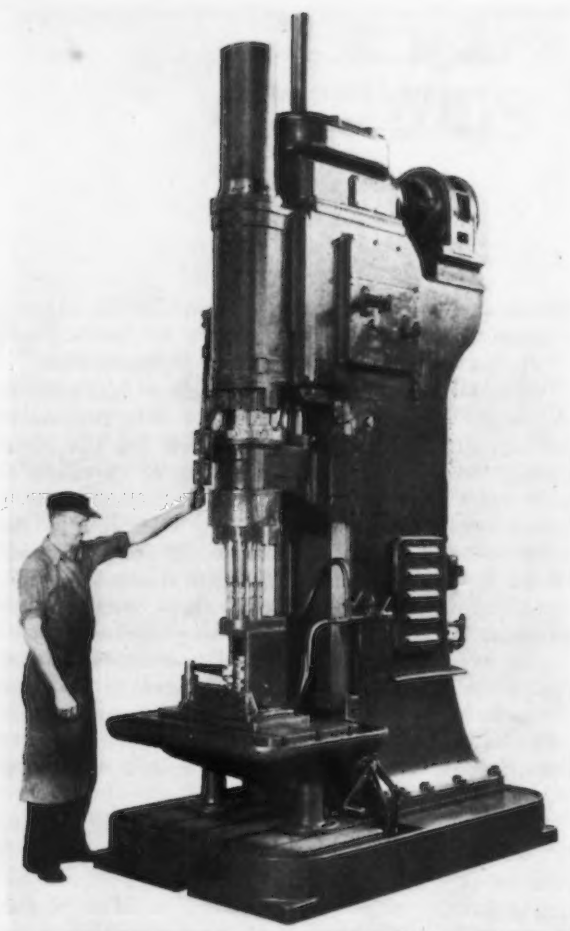
In this connection a strong oil sand mixture is advisable, as the cores thus made easily stand the pressure exerted when ramming round them, and, in the event of their remaining in the mold a few days before the job is cast, do not readily strike damp.

The square gate sticks, as shown in Fig. 1, were next set vertically in line with the slot in each inlet core, a rectangular connection being thus formed at each point. A few light weights placed on the pattern to prevent its displacement, and the mold was rammed up to the floor level. The joint was struck off all over flush

(Concluded on page 66)



UNIT head construction, with driving motor, feed and traverse mechanism and control levers on the head, features these Sellers boring, drilling and milling machines, described on page 26. Drive to the spindle is through short shafts with minimum number of gear contacts.

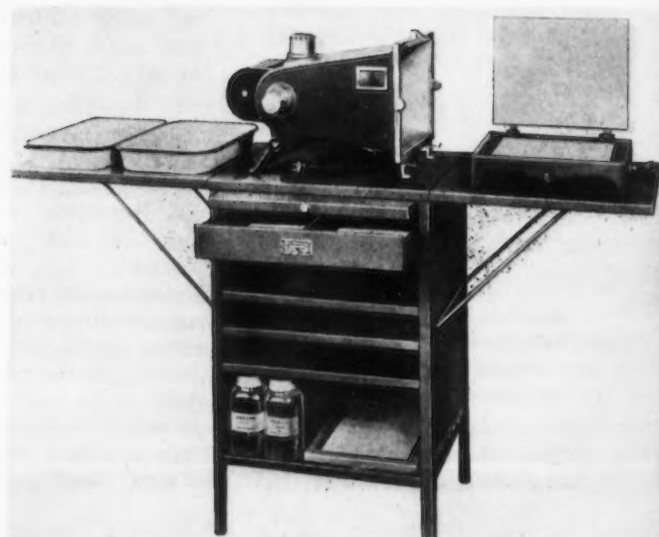
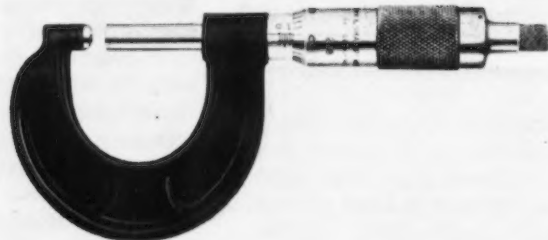


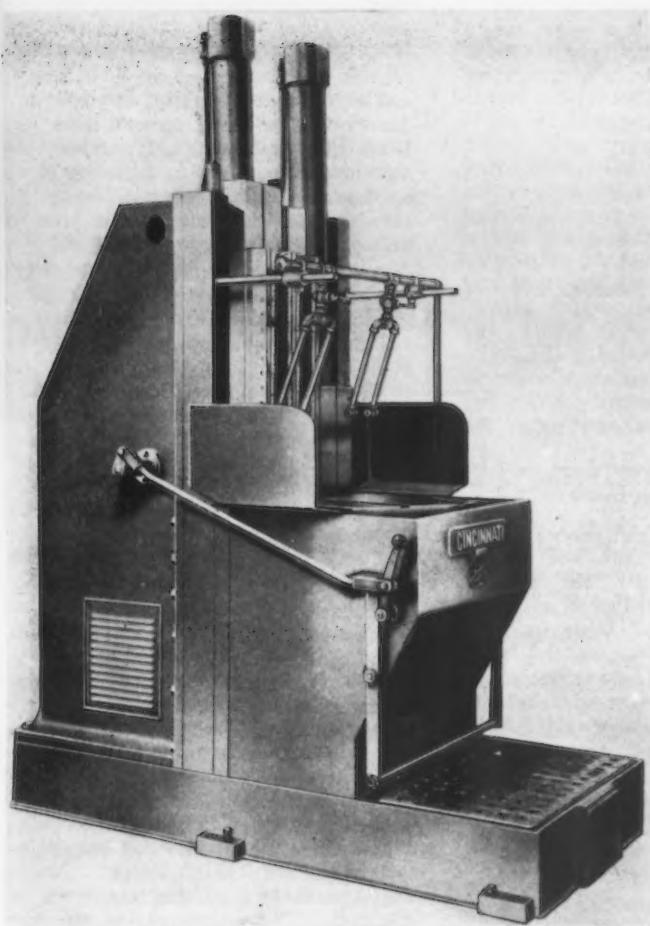
IN this heavy-duty, hydraulic-feed production driller, which has capacity between $3\frac{1}{2}$ and 4 in. in solid steel, the feeding pressure is applied directly over the center of the cutting tool or multiple head. The unit illustrated is equipped with a 9-spindle head for operations on an aircraft motor connecting rod. Features are outlined on page 28.

AT RIGHT

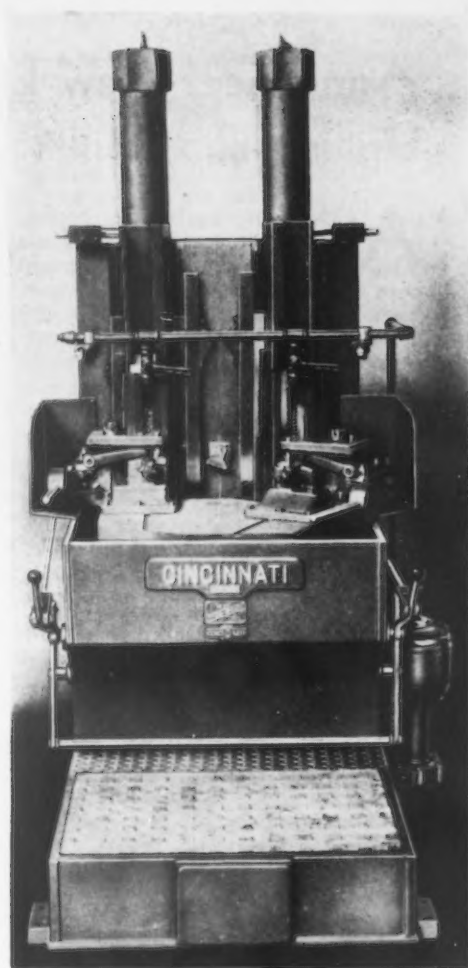
BLUEPRINTS up to 9 x 12 in. may be made conveniently on this equipment, which, as described on page 26, can be furnished complete with cabinet, print dryer and other accessories as shown, or with the blueprinter unit alone. Time of exposure is set on an indicator; upon completion of exposure, usually 1 min., a bell rings.

BELOW
THICKNESS of tubing and pipe of $17/32$ in. and larger in diameter may be measured accurately by the new micrometer caliper, the No. 228, made by the Brown & Sharpe Mfg. Co., Providence, R. I. The range is from 0 to 1 in., by thousandths. The anvil is rounded on one end and is projected sufficiently from the frame to facilitate taking accurate measurements.



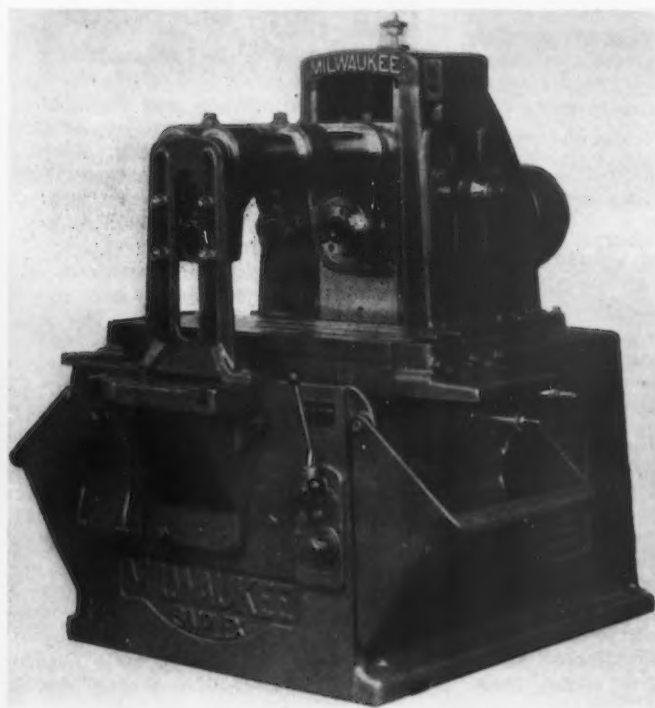


DESIGNATED as the Hydro-Broach, these completely hydraulic surface broaching machines are built by a prominent maker of milling machines, namely, the Cincinnati Milling Machine Co. Extremely fast cycle, continuous operation with automatically indexed work-table, long broach life, and simple work-holding fixtures are features, as stated in the description on page 27.

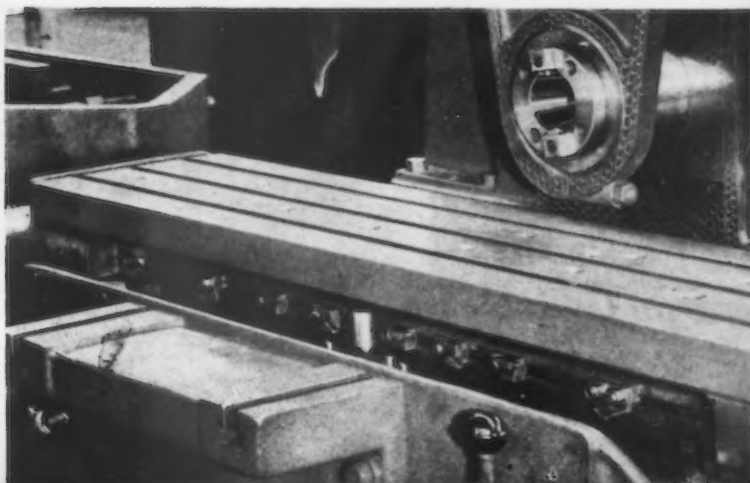


BELOW

THE "two-way" automatic control of these new Milwaukee automatic millers is described on page 28. The compact hydraulic unit incorporated on the saddle affords complete control in a wide variety of milling cycles, both one-way and two-way, with or without automatic spindle stop. The machines are provided with single lever control, whereby rapid traverse, feed and direction are combined in a single lever.



SMALL holes are measured accurately, and out-of-round, bell mouth and taper conditions detected, by this two-point contact, dial micrometer plug gage. Plugs are furnished for sizes from 0.200 to 1½ in. inclusive, and standard lengths range from 2¾ to 5¾ in. Plugs can be changed quickly. The indicator is graduated in 0.0001 in., and the dial is movable for setting. The bench type gage can be operated by hand or foot lever. A portable model, with pistol grip instead of the stand, can be furnished. Federal Products Corp., Providence, R. I., is the manufacturer of this new gage, designated as the model 166.



Announces New Line of Boring, Drilling and Milling Machines

A LINE of horizontal boring, drilling and milling machines designed to provide equipment that is thoroughly modern in respect to materials, construction and facility of control and to maintain close accuracy over long periods of heavy-duty operation is being announced by William Sellers & Co., Inc., Philadelphia. Rapid operation, together with flexibility, adapts these machines for production as well as general-purpose work. The machines are designated as the No. 400 series, the one illustrated on page 24 being the Type C table-type unit, with a 4-in. diameter spindle and either a 30 x 60-in. or a 40 x 60-in. table.

Unit head construction with the driving motor, feed and traverse mechanisms and control levers mounted on the head is an outstanding feature. From the motor the drive is entirely through short shafts and spur gears direct to the spindle with a minimum number of gear contacts, resulting in a compact, "short route" drive designed to assure highly efficient, smooth and steady application of power. Control levers are grouped to permit maximum convenience of operation. A further advantage claimed for the head construction is that in combining the drive, feed and traverse mechanism in one unit the weight of the head is such as to improve the rigidity of the machine under cut.

Unusual number of speed and feed changes, 24 each, is also a feature of the No. 400 machine. Speeds range from 9 to 500 r.p.m. and feeds from 0.0025 to 0.625 in. Rapid traverse is at the rate of 90 in. per min.

Nitrided Steel Spindle

The unit head is powered by a constant-speed motor, either a.c. or d.c. All gears are of chrome-nickel steel, heat treated, and shafts are of alloy steel and are supported in anti-friction bearings. Sliding gears are mounted on multiple spline shafts.

Made of a nitrided steel, the spindle has a Brinell hardness of about 750, and is carried in two equally hard nitrided steel bushings at the front and rear of the spindle sleeve. The sleeve is made of chrome-nickel steel and is supported in precision bearings of tapered roller type. It is unusually long and is designed to maintain proper spindle alignment. A 10-in. diameter flange is provided at the end of the sleeve of the No. 400 machine; it has 1-in. square keys for driving face milling cutters. The sleeve gear is 15 in. in diameter. Chip guards and oil seals exclude chips from the sleeve.

Spindle movement is by lead screw and nut, which provides a powerful and accurate feed and permits thread cutting without extra attachments. Rapid hand movement is obtainable by the spoked wheel at the front end of the head, and micrometer adjustment by a square-end shaft and safety-type crank. Amount of spindle movement is indicated on a micrometer dial. Pick-off gears provide for thread leads not obtained through the standard feeds.

Controls on Head

Spindle speed and all feed controls and the starting, stopping and reversing lever are grouped at the front of the head. Power traverse or hand movement of the head, table and saddle is controlled also from the head, a micrometer dial indicating the movement. Hand adjustment of the table may also be from either side; it is made by means of square-end shafts and micrometer dials on the front end of the saddle. Safety stops and interlocks are provided for the head and table; friction clutches in the feed traverse and drive mechanisms give added protection.

Friction clutch, reversing mechanism in the drive, with the control lever adjacent to the spindle, permits instantaneous start, stop and reversal of the spindle, which is of particular advantage in tapping. The same lever can be used also in controlling the direction of traverse, in addition to the conventional feed and traverse lever operating the traverse in the opposite direction to the feed.

Pressure lubrication provides a constant oil bath for all moving parts within the unit head; a one-shot lubricating system is employed for table, saddle and other important parts that move intermittently.

Equalizing Clamps Provided for Table and Saddle

Bed, upright, outboard support, saddle and table are of heavy box-type construction. All castings are of high-strength iron containing about 50 per cent steel, are well ribbed, and are scraped to an accurate fit. The bed has leveling screws on the lower flange, and is equipped with chip chutes at the rear.

The table travels on a saddle having ways of square-lock type. Self-equalizing table clamps, which are located in line with the spindle, clamp both sides of the table to the ways of the saddle. These clamps are said to be just as effective when the table is at the end of its stroke as when it is at the center. Equalizing clamps are provided also for the saddle; these

work on the outside of the front and rear bed-ways to obtain maximum leverage irrespective of the position of the table.

The outboard bearing for the bar moves vertically in unison with the head. The column that carries this outboard bearing is movable by hand adjustment along the bed; it may be removed quickly from the machine to accommodate long work.

A cutting compound system consisting of a motor-driven pump, a tank located in the machine base and a system of table troughs can be furnished. Other special equipment for the No. 400 machine, here shown, includes a 36-in. diameter swiveling table graduated in 1/2 deg.; a 25 x 25-in. or 36 x 36-in. square swiveling table; and a 5 in. by 6 or 7-ft. auxiliary table. A star feed facing head for diameters up to 24 in. is available, and milling cutters, either high-speed steel or carbide tipped can be furnished.

Specifications of the No. 400 machine illustrated include: Traverse of spindle, 60 in. (2 x 30 in.); maximum distance face of spindle sleeve to outboard support, 72 in.; vertical adjustment of head on column, 30 in.; minimum distance top of table to center of spindle, 1 1/2 in.; distance from top of bed to top of table, 10 in.; cross travel of table, 46 in.; and longitudinal travel of table, 38 in. Power rapid traverse is at the rate of 90 in. per min. The net weight of the machine is approximately 26,500 lb.

Special 4-in. spindle machines having 96 or 120 in. distance between face of spindle sleeve and outboard support can be furnished; also machines with columns and outboard support to give maximum vertical adjustment of 36 in.

New Small Blueprinter Operates Rapidly

EASE of operation and rapid production are features emphasized by the F. A. Smith Mfg. Corp., Rochester, N. Y., in introducing the new Speedway blueprinter pictured on page 24. The equipment is furnished as a printer only, with printing frame; or complete with cabinet, developing trays, dryer and other accessories, as illustrated. The side leaves of the cabinet can be raised or lowered, and the drawer for tracings and blueprint paper is light tight. A pull shelf is provided at the front for holding the printing frame when changing prints.

In operating the printer, tracing and blueprint paper are inserted in the printing frame and then slid in front of the projector. Time of exposure is then set on the indicator, and the arc turned on. Upon completion of exposure, usually 1 min., a bell rings, and the print is then removed from the frame and placed

in the developer. Total cost per print is said to average less than 2c.

The automatic timing mechanism is attached to the bottom of the printer. Carbons are 8 in. long, 8mm. in diameter and are operated by a dual control knob. They are easily inserted and removed. Adapters have been designed to permit using the carbons within 1 in. of total length, and side shields protect them from breakage. The projector of the blueprint is made of pressed steel reinforced with aluminum castings. Leg dimensions are 12 x 17 in.

The dryer, shown on the drop leaf at the right in the illustration, is said to dry the prints in 1 min., without scorching or discoloration. It has a chromium-plated platen reinforced with a heavy aluminum printing plate. The presser is fitted with a moisture absorbing pad to facilitate drying, this pad being inclosed in a removable and washable duck cover. The heating element is of Nichrome. Illuminated current indicator, heavy asbestos cord set and plug, and separate control switch at the side are regular equipment.

by a hydraulic mechanism interlocked with the operation of the vertical rams. The broach in the descending ram engages the work in the fixture which has been indexed to the cutting position, while the fixture on the opposite side of the table has been indexed to clear the broach on the ascending ram. At the completion of the cutting stroke of one ram and the return stroke of the other, the rams stop, the work-table indexes, the rams reverse their direction of movement, and the cycle of operations repeats itself. Indexing time is small, and practically continuous production is obtained, as the operator removes and replaces work in one fixture while the work in the other fixture is being broached. Rigid support is provided for the work-table, which indexes on hardened and ground plates supported by the massive fixed knee.

Milling Machine Builder Introduces Line of Surface Broaching Machines

A LINE of hydraulically-operated surface broaching machines designated as the Cincinnati Hydro-Broach has been announced by the Cincinnati Milling Machine Co., Cincinnati. These completely hydraulic machines are of vertical duplex type, as shown in the illustrations on page 25, and are built in three capacities, namely, 2, 5 and 10-ton, each having a normal and an extended stroke. They feature an extremely fast cycle, continuous operation with automatically indexed work-table; high accuracy; and long tool life. They are simple in design and rigid in construction, and are equipped with simple work-holding fixtures. Lubrication is entirely automatic.

Unusually rapid operation with high hourly production is emphasized. It is stated that the operating cycle is so arranged that the actual cutting time is but a fraction of that required on any other type of machine tool. Long tool life greatly reduces cutter changing and gives more time for actual machining. The broach is backed up by a heavy ram which slides in the guideways of a rugged vertical column; this, in providing rigid support for the tool and in eliminating vibration, further contributes to longer tool life. Life of the broach is also increased by the cushioning effect of the hydraulic pressure that moves the broach rams.

Final Sizing Is By Finishing Teeth

Final sizing and finishing of work are accomplished by finishing teeth that remove a small amount of stock per tooth. As these teeth are never used for roughing, they last a long time. Because less power is required to do the work, heating of the tool and work is kept at a minimum. Prolonged tool life is also attributed to the fact that the broach teeth pass through the work at slow cutting speed, giving a lower rate of chip formation. Tool upkeep is low.

Accuracy of finished surfaces, with minimum effort, is due to final sizing of the work by the finishing broach teeth, which move in a straight path. There is but one slide in cutting motion at a time, and the broaching tool is adequately supported against cutting pressures by being fastened securely to the ram slide.

Simple fixtures are employed as the forces set up by the broaching operation act in readily ascertainable directions. Sometimes clamping of the work is not required. Low fixture costs, therefore, are a feature, and the minimum of time required for loading and unloading the simple fixtures contributes to high production.

The columns that carry the rams are mounted on a large base which contains reservoirs for cutter coolant and the oil used in the hydraulic system. The machines are of duplex type; one ram goes up while the other comes down. A horizontal work-table indexing around a vertical axis is mounted in front of the two moving rams. The indexing table is mounted at a height convenient for an operator of average size standing on the platform at the front of the machine base.

Indexing of the table is controlled

The automatic cycle is a pace setter for the operator. Should he find that he cannot keep up with the pace, he may stop the machine instantly by kicking the treadle bar with either foot from any position on the platform. Ram movement can be reversed if desired after stoppage by exerting pressure on the hand lever located on either side of the fixed knee.

Low maintenance is a feature. The table indexing mechanism is of simple design, utilizing the Geneva principle. The table is accelerated and decelerated during indexing without any noticeable shock by means of hydraulic pressure. The ram slides are moved by hydraulic pressure as described, supplied by a standard hydraulic pump directly connected by a flange coupling to a constant-speed motor.

Automatic lubrication assures long life and low maintenance for the wearing surfaces of the ram ways, table bearing and indexing mechanism. Valve mechanism and hydraulic pump are self-oiling. A standard motor-driven pump with 20-gal capacity supplies ample amount of cutter coolant to the broaches.

General specifications are as follows:

Machine sizes.....	2-36	2-48	5-42	5-54	10-54	10-66
Maximum stroke, in.....	36	48	42	54	54	66
Maximum broach length, in.	32	44	38	50	50	62
Broaching force for which tools should be designed, lb.....	5,000	5,000	10,000	10,000	20,000	20,000
Each machine can be supplied with pumps and motors to give ram speeds as follows:						
1.—Speed, ft. per min..	24	24	20	20	21½	21½
Hp. of 1140-r.p.m. motor	7½	7½	15	15	25	25
2.—Speed, ft. per min..	34	34	31	31	27.7	27.7
Hp. of 1140-r.p.m. motor	10	10	20	20	30	30
3.—Speed, ft. per min..	38	38	41.4	41.4	37.2	37.2
Hp. of 1140-r.p.m. motor	15	15	25	25	40	40
Overall height.....	9ft.1 in.	11ft.1 in.	9ft.4 in.	11ft.4 in.	11ft.8 in.	13ft.8 in.
Weight, net, lb.....	10,000	11,000	13,000	14,000	17,000	18,000

"Two-Way" Automatic Control Features New Milwaukee Millers

MILWAUKEE Simplex and Duplex bed type milling machines introduced by Kearney & Trecker Corp., Milwaukee, in 1930, are now provided with complete "two-way" automatic control. With this feature, the table can be operated automatically or manually or with a combination of both as most convenient for the immediate job.

To obtain complete automatic control, a small, compact hydraulic operator, or control unit, has been designed and incorporated in the saddle of the machine. This unit affords complete automatic control in a wide variety of milling cycles, both one and two-way, with or without automatic spindle stop, depending on requirements.

The two plungers shown at the left and right of the tripping post in the close-up illustration on page 25, control operation of the unit for automatic reversal of the table and rapid return. At the selected point for automatic reversal, a dog depresses the plunger, slightly opening a valve which causes the plunger to jump ahead under hydraulic pressure. The entire operation of reversal is then accomplished hydraulically, at a fast, constant rate, controlling accurately the point of reversal, regardless of load.

In previous practice, the clutch was withdrawn mechanically at the feed rate speed; it is stated that the slow withdrawal subjected the clutch to severe strain, and greatly limited the accuracy of the point of reversal.

The automatic reverse is always followed by an instantaneous shift to rapid traverse. A simple interlock provides that the reverse clutch must be completely engaged before engagement of rapid traverse, resulting in smooth, quiet operation and avoiding clashing of clutches at rapid traverse speed.

Table Control Dogs Fully Inclosed

The table dogs and tripping mechanism are entirely inclosed in a compartment in the side of the table. A sliding cover makes the dogs readily accessible and yet prevents entrance of dirt, chips, and coolant which would interfere with the accuracy of tripping and cause excessive wear on the dogs and tripping posts.

In providing complete, dog-controlled table movement of any milling cycle desired, the new automatic system is emphasized as eliminating lost time and speeding up production. Four typical cycles are:

- 1.—Feed from right to left, reverse, rapid return to starting point and stop.

- 2.—Feed from left to right, reverse, rapid return to starting point and stop.
- 3.—Approach work in rapid traverse, intermittent feed and rapid traverse, reverse, rapid return to starting point and stop.
- 4.—Continuous automatic cycle, rapid traverse to work, feed, reverse, rapid traverse, feed, reverse, etc.

Automatic spindle stop is available on all Milwaukee Simplex and Duplex machines. A small selector lever at the front enables the operator to select automatic spindle stop or conventional control as desired. The spindle stop works with both one-way and two-way cycles. When selected, the spindle stops automatically whenever rapid traverse is engaged. Use of the spindle stop during rapid return requires no additional table travel, and, therefore, the entire range of feed can be utilized for milling.

The machines are provided with

single lever control, whereby rapid traverse, feed, and direction, are combined in a single lever. This is the top lever in the illustration. The table feeds in the direction in which the lever is moved. Rapid traverse in either direction is obtained by pulling the lever outward. The second lever engages and disengages the main clutch and has "start" and "stop" positions. The machine has "live" rapid traverse, whereby the table may be rapid traversed in either direction with spindle and feed mechanisms stopped. The bottom lever is for selecting automatic spindle stop or conventional control.

When a machine is to be used for climb cutting, a hardened screw and special take-up nut can be furnished as an extra.

Any one of three feed ranges, $\frac{1}{2}$ to 20, 1 to 40, or $2\frac{1}{2}$ to 100 in. per min., is obtainable. There are 18 changes within each range. Four speed ranges available; they are: 20 to 135, 40 to 270, 75 to 500, and 150 to 1000 r.p.m.

There are ten changes of speed in each range. Speed ranges can be changed in the field.

New Hydram Driller Has Capacity for Drilling 3½-In. Holes in Steel

THE Barnes Drill Co., Rockford, Ill., has brought out a heavy-duty hydraulic-feed drilling machine, designated as the No. H-3½ Hydram driller, with capacity for 3½ to 4-in. holes in solid steel forgings.

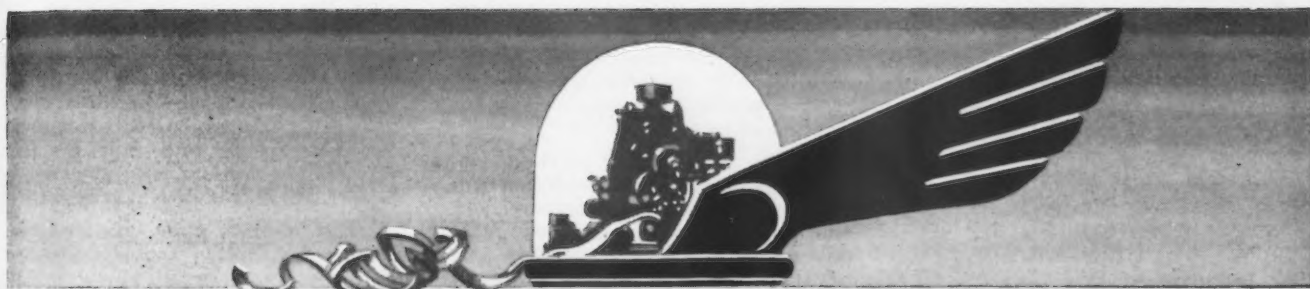
As in previous Hydram drillers the hydraulic feeding pressure is applied directly over the center of the cutting tool or multiple head. The large hydraulic cylinder and ram eliminates the need of a long saddle on the column ways for maintaining alignment, a short saddle on the column taking the torque of the driveshaft. Driving power is transmitted directly to the cutting tool with a minimum of torsional vibration. This is accomplished through a reduction of speed from the vertical driveshaft to a comparatively short, large-diameter spindle by gears carried in a gear-case on the nose of the ram. Maximum stiffness of the sleeve or ram, which is of equal length on each side of the piston, gives a support in the upper bearing (and lower) within the entire spindle travel. The construction absorbs lateral strains through the large-diameter, securely-supported ram, effectively guided in its travel and having the tool-supporting head directly attached thereto.

The hydraulic unit is unusually versatile as to spindle travel, multiple-head interchangeability, vertical, horizontal and angular applications.

The machine, pictured on page 24, is offered for production boring, reaming and facing operations; also for use with any layout of multiple heads, which may be interchanged conveniently. The hydraulic unit may be arranged specially for cylinder boring, and also for independent use, such as a separate drilling head on any other machine frame.

The illustrations show the machine fitted with a nine-spindle auxiliary head drilling in one set-up the master connecting rod for an aircraft motor. After drilling the fixtures are changed and the same machine and multiple-head with suitable tools, guided above and below the work, do the boring and final reaming operations. Eight of the bores are 22.5 mm. in diameter and the ninth is 18.41 mm. For production, a battery of these machines, each equipped with fixtures and tooling for a particular operation, will be installed.

Specifications include: S wing, standard, 32 in.; distance face of column to center of table, 16¼ in.; maximum distance from No. 6 taper spindle to regular table, 33 in.; and maximum distance from spindle to base, 49½ in. Diameter of spindle nose is 4½ in. The vertical travel of the spindle is 20 in. and of the table 22 in. A 25-hp. motor is recommended for drilling up to 3½ in. in steel.



THE NEWS OF THE WEEK

Industrial Advisers for Working Capital Loans

INDUSTRIAL advisory committees have now been named for all of the twelve Federal Reserve districts. These constitute the agencies through which banks and other lending institutions will get advice respecting applications from industrial or commercial enterprises for loans for working capital, all under an amendment to the Federal Reserve act providing for extending loans for a period up to five years.

As explained at some length in *THE IRON AGE* of Aug. 16, page 28, each district is to be served by a committee of five members "actively engaged in some industrial pursuit," but serving without compensation and occupying a place that is a reminder of the dollar-a-year men who held forth in Washington during the war.

The whole movement is of prime importance if there is any large number of industrial and business concerns which need the intermediate form of credit to get them back toward a nominal scale of operations. The provision of the advisory committees is a recognition of conditions that require a more searching and intimate knowledge of a given company or a given company's field than could easily be possessed by the lending institution and all with the thought of granting the accommodation if there is good warrant.

To Aid in Passing on Loans

These advisory committee appointments include the following for the districts named:

No. 1, Boston: Carl P. Dennett, director, Griffin Wheel Co., Boston.

No. 2, New York: William H. Pouch, president, Concrete Steel Co., New York, chairman of the committee.

No. 3, Philadelphia: J. Ebert Butterworth, vice-president, H. W. Butterworth & Sons Co., Philadelphia, committee chairman; Charles E. Brinley, president, American Pulley Co., Philadelphia.

No. 4, Cleveland: F. A. Smythe, president, Thew Shovel Co., Lorain, Ohio, committee chairman; Frank B. Ball, president, Edgewater Steel Co., Oakmont, Pa.; Daniel R. Davies, president, Acme Machinery Co., Cleveland, vice-chairman of the committee; H. L. Kutter, president, Black & Clawson Co., Hamilton, Ohio.

No. 5, Richmond: Overton D. Dennis, Dominion Oil Co., Richmond; George E. Probest, Jr., secretary-treasurer, Bartlett-Hayward Co., Baltimore; Walker D. Stuart, president, Richmond Hardware Co., Richmond.

No. 6, Atlanta: A. R. Forsyth, executive vice-president, Gulf States Steel Co., Birmingham; Ernst T. George, president, Seaboard Refining Co., New Orleans; William A. Parker, president, Beck & Gregg Hardware Co., Atlanta, committee vice-chairman.

No. 7, Chicago: Max Epstein, chairman, General American Tank Car Corp., Chicago, chairman of committee; R. R. Monroe, president, Des Moines Foundry & Machinery Co., Des Moines, Iowa; William R. Odell, Jr., treasurer, International Harvester Co. of America, Chicago.

No. 8, St. Louis: William K. Norris, president, McQuay-Norris Mfg. Co., St. Louis, committee chairman.

No. 9, Minneapolis: Sheldon V. Wood, president, Minneapolis Electric Steel Casting Co., Minneapolis, committee chairman; John Bush, president, Cleveland Cliffs Iron Co., Ne-gaunee, Mich.

No. 10, Kansas City: R. L. Gray, president Sheffield Steel Corp., Kansas City, committee chairman.

No. 11, Dallas: T. M. Cullum, president, Cullum & Boren Co., Dallas; Charles R. Moore, president, Austin Bridge Co., Dallas.

No. 12, San Francisco: Shannon Crandall, president, California Hardware Co., Los Angeles; H. L. Terwilliger, manager, Ingersoll Rand Co., San Francisco.

New Institute Extra Book Will Contain 408 Pages

A NEW book of extras, published by the American Iron and Steel Institute, will be made available for delivery to members Aug. 31. The revised book will become effective Sept. 1 on sales of products for shipment on or after Oct. 1. It contains 78 sections, 75 of which cover different classifications of steel products. New sections have been added covering axle steel bars, ferromanganese and wrought iron plates and sheets.

The book also contains sections covering Manufacturers' Standards for Chemical Composition; Manufacturers' Standard Permissible Variations from Ordered Chemical Limits; and Manufacturers' Standard Methods of Sampling for Rolled and Forged Products.

The new book contains 408 pages compared with 284 pages in the old extras book. A new feature of the book is that single sections or any combination of sections are now available in book form.

The book was prepared under the supervision of the institute's committee on commercial matters and the technical committee by order of the board of directors of the institute. The technical committee has been giving its special attention to working out a logical gradation of extras from the semi-finished material upward, relating charges in all cases to the increases in cost involved. The new extra book, as contrasted with its predecessors, represents a more logical treatment of the material at hand and

reflects an attempt to use more uniform and consistent methods. The sections on bars, plates and sheets and semi-finished steel have been considerably clarified and coordinated. The treatment of the wire rod section is almost entirely new, and contains about eight pages never before published, forming the basis for determining the extras on wire products. The sections on wire and wire products have likewise been expanded and clarified and contain considerable additional information regarding the various qualities and grades.

A new feature of the extra book is a definition of carloads for purposes of determining extras. A carload in such a sense is considered 36,000 lb. in all cases. The book will be in loose-leaf form with a Chicago post binder. Its price is 75c. for steel code members and \$1 for non-members.

Conference Board Lists Unemployed at 8,609,000

THE total number of unemployed workers in July, 1934, was 8,609,000, according to an estimate of the National Industrial Conference Board. This is an increase of 675,000, or 8.5 per cent, from June, 1934, and a decline of 4,594,000, or 34.8 per cent, from the total in March, 1933, when unemployment was at its highest point.

The increase in unemployment in July from June followed an increase of 89,000 in June from May, 1934, when unemployment was down to 7,845,000, the lowest point since March, 1933. Of the total increase from June to July, 403,000 occurred in manufacturing and mechanical industries, 271,000 in trade, and 4000 in extraction of minerals. In transportation there was a decline in unemployment of 43,000.

As compared with the situation in March, 1933, unemployment in July, 1934, was 54.3 per cent lower in manu-

facturing and mechanical industries; 17.0 per cent lower in transportation; 41.5 per cent lower in trade; 28.7 per cent lower in domestic and personal service; and 19.3 per cent lower in extraction of minerals.

In this estimate the workers employed through the Public Works Administration are counted as employed. Emergency workers employed under Government auspices, usually part time, in lieu of direct unemployment relief are counted as unemployed.

The following table shows the number of unemployed workers in the various industrial groups in March, 1933; July, 1933; June, 1934, and July, 1934.

Standard Tin Plate Co. Signs with Amalgamated

CANONSBURG, PA., Aug. 28.—The Standard Tin Plate Co., subsidiary of the Continental Can Co., has signed contracts with the Amalgamated Association of Iron, Steel & Tin Workers, according to announcement by the company's general manager, D. B. Geeseman. The contracts stipulate that the Amalgamated Association will be the official bargaining agent for all employees of the company, according to the report.

Railroad to Make Blanket L.C.L. Rates

MINNEAPOLIS, St. Paul, and Sault Ste. Marie Railroad announces that it will establish a uniform system of rates on less than carload freight shipments, the charge to be based entirely upon the weight of the package to be shipped with no reference to the nature of the contents. There will be a few minor exceptions, to be announced later.

The blanket system of rates will apply between stations in Illinois and destinations on the Soo Line in Wisconsin, the upper peninsula of Mich-

igan, Minnesota and the Dakotas. The standard is to be 60 per cent of the present first class rate with a few minor exceptions, and such charge will include both pick-up and delivery services. If shippers prefer to handle their own freight to or from the railway freight stations, an allowance of 5c. per 100 lb. for each service will be made.

Progress in Tin Research Assistance to Industry

THE first general report of the International Tin Research and Development Council, just issued, describes the service which this organization has rendered in supplying technical information to manufacturers and scientific investigators in many countries, and summarizes the progress made in the program of fundamental researches being carried on to develop new outlets for tin.

The council has organized and is directing researches on basic problems relating to major applications of tin, which it has delegated to university, governmental and industrial laboratories. The work so far has been distributed in the United States, England, France, Germany and Holland. Centralization has been avoided in order to meet more adequately the special requirements of the tin consuming industries in the various countries.

Progress has been made in all of these researches and in important directions results already obtained promise a definite influence in improving products containing tin. New uses for tin are mentioned, including a new dry electrical accumulator, and the application of tin compounds.

Among the applications of tin covered by the researches are: tin plate; bearing metals; preparations of alloys from powdered metals; solders and other lead-tin alloys; bronzes; addition of other elements to tin; hot-tinning of cast iron, steel, copper, etc.; electro-deposition of tin and tin alloys; anodic oxidation and coloring of tin; spraying of tin; pewter; collapsible tubes; tin foil; block tin pipe; tin in steel and nickel alloys; tin compounds.

The report describes the organization of a special Bureau of Technical Information for the purpose of furnishing technical information to manufacturers and research workers and for publication of the results of research and development. The council has also established a Statistical Office at The Hague, and an office in New York, where the United States Tin Research and Development Committee of the American Tin Trade Association is cooperating in the program.

Copies of the report may be had upon application to the New York Office of the International Tin Research and Development Council at 149 Broadway.

Industrial Group	Number of Unemployed In Thousands			
	March, 1933	July, 1933	June, 1934	July, 1934
Extraction of minerals.....	576	604	461	465
Manufacturing and mechanical.....	6,423	4,919	2,535	2,938
Transportation	1,591	1,503	1,364	1,321
Trade	2,126	1,870	973	1,244
Domestic and personal service.....	607	567	434	433
Industry not specified.....	539	498	416	430
Other industries ¹	296	296	296	296
All industries.....	12,158	10,256	6,479	7,128
Allowance for new workers since 1930 Census	1,045	1,160	1,455	1,481
Total unemployed	13,203	11,416	7,934	8,609

¹ This group includes agriculture, forestry and fishing, public service, and professional service. The number given is that of the unemployed in 1930, no figures being available from which later changes in unemployment can be computed.

British Pig Iron Demand Expanding, Finished Steel Slow

LONDON, ENGLAND, Aug. 28 (By Cable).—Heavy shipments of pig iron are being made to domestic and overseas destinations. The stocks accumulated during the North East Coast holidays are considerably below the amount anticipated and there are indications of a brisk Autumn pig iron trade. A thousand-ton shipment to Australia is the first of this size in many years.

Semi-finished mills are kept well employed on present backlogs, although new demand is slow despite the lessening of Continental competition.

Makers of rails and structural shapes are busy, but the demand for shipbuilding material and plates is becoming less satisfactory. China is buying rails and there is better inquiry from the Argentine.

Tin plate makers are well booked and South Welsh output may soon reach 70 per cent. New domestic business is slow, but export business is expanding, particularly with South America. Far Eastern demand is disappointing.

The Continental iron and steel business is slow owing to summer holiday influences. Hamburg exporters have

received large Japanese and Manchurian orders for plates and shapes. The International Raw Steel Cartel and Scandinavian makers have agreed on organization of the Scandinavian markets, and Swedish makers have been allotted a monthly quota of 20,000 tons.

International Rail Makers' Association reports improved orders from markets long inactive, including 4000 tons from Manchukuo, 25,000 tons from Argentina and 10,000 tons from Rumania.

Summer Slump Hits Structural Steel Demand

A MIDSUMMER slump in bookings of structural steel for fabrication reversed the improved trend of new business which had been recorded during the first half of 1934, according to the American Institute of Steel Construction.

July shipments, according to reports received by the Institute, were approximately 59 per cent larger than for the same month last year. Reports from 80 per cent of the industry indicate that the bookings during July were about 29 per cent less than the average monthly bookings during the previous six months, and 1 per cent less than for July, 1933.

Since June there has been a corresponding absorption of available tonnage on the books. Tonnage available for future fabrication now is approximately 7 per cent larger than at this time last year.

Chicago Purchasing Agents Offer Commerce Scholarships

THREE scholarships for the first semester course in purchasing at the School of Commerce, Northwestern University, Chicago, are being given by the Purchasing Agents' Association of Chicago.

The first will be awarded to the student who submits the best paper by Sept. 12, approximating 1000 words on some pertinent purchasing subject: regulation and control of cash discounts, measurement of purchasing efficiency, inventory control and its relation to purchasing, purchase budgeting, departmental organization for purchasing control and administration, selection of sources of supply, salvage material control, co-operative and pool buying, etc.

The second scholarship will be given

to a deserving stores or purchasing employee recommended by some member of the association and the third to a student in the Northwestern School of Commerce, recommended by the Dean's office.

The judges are: George A. Neesham, president, and John Mohr, second vice-president of the Purchasing Agents' Association, J. L. Burgess of their Educational Committee, and Prof. Fred Clark of the School of Commerce, Northwestern University.

The scholarships include registration fee and tuition in the purchasing course for one semester.

Dardelet Threadlock Corp. Elects Officers

DARDELET THREADLOCK CORPN., 120 Broadway, New York, has elected the following officers: A. Morris Thompson, president; William R. Davis, vice-president; Milton W. Blackmar, treasurer, and Charles J. Gass, secretary.

During the past two and one-half years the Dardelet corporation, through cooperation with steel erectors and structural engineers, has made wide extension of the application of the rivet bolt. In combination with the self-locking thread principle originated by this company, the rivet bolt has become a substitute, in many instances, for field driven rivets.

Wales Gets Large Share of Tin Plate

WALES is to be allotted 55 per cent of the world tin plate market under the provisional arrangement of quotas incorporated into the recently signed international tin plate agreement, according to a report from Vice-Consul Paul C. Seddicum, Cardiff, made public by the Commerce Department at Washington.

The next largest quota has been granted to the United States and is 22 per cent, followed by Germany with an allotment of about 16 per cent. The remaining 7 per cent has been divided between Italy and France.

United Engineering Will Build Ford Strip Mill

YOUNGSTOWN, Aug. 28.—The United Engineering & Foundry Co. has been awarded contract by the Ford Motor Co. for an 84-in. cold strip mill, to cost approximately \$400,000. The mill, which will be constructed at Youngstown and delivered to the Ford company's River Rouge, Mich., works, will be a single-stand reversing 4-high mill and will be used to cold-roll strip, up to 72 in. wide, to be produced on the large continuous strip mill for Ford now being constructed.

British Prices, f.o.b. United Kingdom Ports

Per Gross Ton		
Ferromanganese, export	\$9	
Billets, open-hearth	\$5 10s.	to \$5 15s.
Tin plate, per base box	18s.	to 18s. 3d.
Steel bars, open-hearth	\$7 17½s.	
Beams, open-hearth	\$7 7½s.	
Channels, open-hearth	\$7 12½s.	
Angles, open-hearth	\$7 7½s.	
Black sheets, No. 24 gage	\$9 5s.	
Galvanized sheets, No. 24 gage	\$11 5s.	

Official Continental Prices, f.o.b. Continental Ports

Per Metric Ton, Gold £		
Current dollar equivalent is ascertained by multiplying gold pound price by 124.14 to obtain franc equivalent and then converting at present rate of dollar-franc exchange.		
Billets, Thomas	\$2 7s.	
Wire rods, No. 5 B.W.G.	\$4 10s.	
Steel bars, merchant	\$3 5s.	
Sheet bars	\$2 8s.	
Plates, ¼ in. and up	\$4	
Plates, 3/16 in. and 5 mm.	\$4 2s. 6d.	
Sheets, ¼ in.	\$4 7s. 6d.	
Beams, Thomas	\$3 2s. 6d.	
Angles (Basic)	\$3 2s. 6d.	
Hoops and strip base	\$4 2s. 6d.	
Wire, plain, No. 8	\$5 7s. 6d.	
Wire nails	\$5 15s.	
Wire, barbed, 4-pt. No. 10 B.W.G.	\$8 15s.	

A.I.S.E.E. Announces Program For Cleveland Meeting

A COMPREHENSIVE program has been arranged for the 30th convention and exposition of the Association of Iron and Steel Electrical Engineers, to be held in Cleveland, Sept. 18 to 20, inclusive.

Of special interest will be an address by T. M. Girdler, president and chairman of Republic Steel Corp., which will be delivered before all of the engineering divisions of the association.

As in previous years, the iron and steel exposition will be one of the features of the convention. The exposition will be in the Cleveland Public Auditorium and the technical sessions will be held in Hotel Statler.

Following is the detailed program:

TUESDAY, SEPT. 18, 1934

9 A. M.—Registration.

9.15 A. M.—*Business Session*, Ball Room, Mezzanine Floor, Statler Hotel, Cleveland.

MECHANICAL, ELECTRICAL AND LUBRICATION DIVISIONS

Technical Session, Ball Room, Mezzanine Floor, Statler Hotel.

9.30 A. M.—*"Developments in the Iron and Steel Industry,"* by Walter H. Burr, supt., elec. and mech. depts., Lukens Steel Co., Coatesville, Pa.

10 A. M.—*"A Review of Sheet Tin and Strip Mills,"* by Stephan Badlam, consulting engineer, Pittsburgh.

10.30 A. M.—*"Electrical Equipment for High Speed Precision Merchant Mills,"* by Ralph H. Wright, gen. engr. dept., Westinghouse Electric & Mfg. Co., East Pittsburgh.

11.30 A. M.—Discussion.

12.15 P. M.—*Luncheon*, Lattice Room, Mezzanine Floor, Statler Hotel.

ALL ENGINEERING DIVISIONS

1:15 P. M.—*"Industrial Relations Between the Employer and Employee,"* by T. M. Girdler, chairman-of-board, Republic Steel Corp.

MECHANICAL, ELECTRICAL, COMBUSTION AND LUBRICATION DIVISIONS

2 P. M.—*"Precision Rolling Mills,"* by S. M. Weckstein, asst. chief engr., Timken Roller Bearing Co., Canton, Ohio.

3 P. M.—*"Mechanical Billet Chipping,"* by George W. Lentz, consulting engineer, Canton, Ohio.

3.45 P. M.—*"Special Electrical Drives for Steel Cleaning and Processing Machines,"* by A. M. MacCutcheon, chief engr., and W. R. Hough, elec. engr., Reliance Electric & Engineering Co., Cleveland.

7.30 P. M.—*Iron and Steel Exposition* visit by national officers, national engineering committees, membership and guests, Cleveland Public Auditorium.

8 P. M.—*Reception for Maintenance Engineers of the City of Cleveland* at Iron and Steel Exposition.

9 P. M.—*Reception of the President*, W. H. Burr, national officers and district

section officers of the A. I. & S. E. E., Iron and Steel Exposition.

10 P. M.—*Exhibitor's Informal Dance*, Ball Room, Mezzanine Floor, Statler Hotel.

WEDNESDAY, SEPT. 19, 1934

LUBRICATION ENGINEERING DIVISION

Technical Session, Ball Room, Mezzanine Floor, Statler Hotel.

9.30 A. M.—*"Servicing of Steam Turbine, Diesel and Transformer Oils,"* by R. P. Dunmire, vice-president, Buckeye Laboratories, Inc., Alliance, Ohio.

10.15 A. M.—*"The Progress of Centralized Lubrication in the Steel Industry,"* by A. J. Jennings, Farval Corp., Cleveland.

11 A. M.—*"Factors Affecting the Circulation of Oil,"* by Maurice Reswick, lubr. engr., Standard Oil Co. of New Jersey.

11.30 A. M.—*"New Developments in Lubrication,"* by G. W. Miller, pres., American Lubricants, Inc., Buffalo.

1 P. M.—Discussion.

ELECTRICAL AND MECHANICAL ENGINEERING DIVISIONS

Technical Session, Lattice Room, Mezzanine Floor, Statler Hotel.

9.30 A. M.—*"Electrical Characteristics of Main Drive Motors at Inland Steel Company,"* by Wray Davis, elec. engr., Allis Chalmers Mfg. Co., Milwaukee.

10.30 A. M.—*"Individual Motor Drives for Run Out Tables and Coilers—Dynamic Braking through Direct Current,"* by F. E. Harrell, asst. chief engr., and C. V. Gregory, engr., Reliance Electric & Engineering Co., Cleveland.

11.30 A. M.—*"Run Out Tables,"* by C. C. Wales, chief engr., Otis Steel Co., Cleveland.

Inspection Trip—Otis Steel Co., Cleveland.

4.30 P. M.—*Visit the Iron and Steel Exposition*, Cleveland Public Auditorium.

6 P. M.—*Exhibitors' Reception and Dinner*, Exhibit Hall, Cleveland Public Auditorium. *Remarks*, by W. H. Burr, supt., elec. and mech. depts., Lukens Steel Co., Coatesville, Pa.; J. A. Clauss, chief engr., Great Lakes Steel Corp., Ecorse, Mich., and W. E. Miller, elec. and mech. supt., Bethlehem Steel Co., Johnstown, Pa.

THURSDAY, SEPT. 20, 1934

COMBUSTION ENGINEERING DIVISION

Technical Session, Lattice Room, Mezzanine Floor, Statler Hotel.

9 A. M.—*"Comparative Value of Fuels as Applied to the Steel Industry,"* by H. V. Flagg, comb. engr., American Rolling Mill Co., Middletown, Ohio.

10 A. M.—*"The Development of the Modern Blast Furnace,"* by Arthur G. McKee, pres., Arthur G. McKee & Co., Cleveland.

11.30 A. M.—*"The Generation of Power in Industry by Diesel Engine Using Heavy Fuel Oils,"* by J. H. G. McConehy, chief engr., Sun Shipbuilding & Dry Dock Co., Chester, Pa., and K. E. DeRosier, fuel oil engr., Sun Oil Co., Philadelphia.

1 P. M.—*"Super-Imposed Steam Turbine Generator Plants for the Steel Mill,"* by A. G. Darling, ind. engr. dept., General Electric Co., Schenectady.

2 P. M.—*"The Control of Open-Hearth Furnaces,"* by A. J. Boynton, vice-pres., H. A. Brassert & Co., Chicago.

3 P. M.—*"Theory and Practice of Inversion Heating with Gaseous Fuels with particular reference to its application in the Steel Finishing Industry,"* by E. B. Dunkak, vice-pres., C. M. Kemp Mfg. Co., Baltimore.

3.30 P. M.—*"Propane and Butane As Industrial Fuels,"* by W. H. Bateman, propane engr., Sun Oil Co., Philadelphia, and E. A. Jamison, eastern manager, Phillips Petroleum Co., Philadelphia.

WELDING ENGINEERING DIVISION

Technical Session, Ball Room, Mezzanine Floor, Statler Hotel.

9.30 A. M.—*"Developments in Welding,"* by G. A. Hughes, elec. engr., Truscon Steel Co., Youngstown, Ohio.

10 A. M.—*"Nitrogen in Metallic Arc Weld Metal,"* by Dr. P. P. Alexander, General Electric Co., Schenectady, and Dr. J. W. Miller, Reid-Avery Co., Dundalk, Md.

11 A. M.—*"Oxy-Acetylene Welding and Cutting in Metal Working,"* by W. S. Walker, The Linde Air Products Co., Cleveland.

1 P. M.—*"Recent Developments in the Welding of Aluminum Alloys,"* by D. I. Bohn, elec. engr., Aluminum Co. of America, Pittsburgh.

1.45 P. M.—*"Tube Control in Connection with Resistance Welding,"* by Dr. J. Slepian and R. N. Stoddard, Westinghouse Electric & Mfg. Co., East Pittsburgh.

2.45 P. M.—*"The Application of Meters to Welding,"* by Paul M. Lincoln, director, School of Engineering, Cornell University, Ithaca.

3.45 P. M.—*"Thermit Welding—Its Economic Importance in Steel Mill Maintenance,"* by J. B. Tinnon, mgr., Metal & Thermit Corp., New York.

10 P. M.—*Formal Reception and Dance*, Ball Room, Mezzanine Floor, Statler Hotel.

Allowance on Southern Iron Shipped by Water

A DEDUCTION of 60c. a ton on water or rail-and-water shipments of Southern pig iron to certain North Atlantic points has been authorized in a resolution adopted by the steel code authority. Since there was previously an allowance of 38c. a ton below all-rail delivered prices from the nearest basing point, the new ruling means that the total deduction permitted will be 98c. a ton.

The allowance is limited to lots of 400 tons or more and to pig iron containing not less than 7/10 of 1 per cent of phosphorus. The reductions apply to deliveries f.o.b. barge or vessel alongside dock of purchaser at Phillipsdale, R. I.; Branford, Conn.; Bridgeport, Conn.; Yonkers, N. Y.; Brooklyn, N. Y.; Elizabethport, N. J.; Bayonne, N. J.; Roebing, N. J.; Burlington, N. J., or Florence, N. J. The resolution represents an interpretation of paragraph 9 of Regulations No. 4 as prescribed by the board of directors on June 14.

PERSONALS

E. A. BATEMAN, who has been associated with Pickands, Brown & Co. in their Chicago office since 1904, has resigned, effective Sept. 1, to become a partner in the firm of Bauer-Wilson & Bateman, 310 South Michigan Avenue, Chicago. Mr. Bateman went to Chicago in 1902 from St. Louis, and was then connected with the Milwaukee Coke & Gas Co. He was instrumental in the introduction of Milwaukee Solvay foundry coke in the Central West. He later became associated with Pickands, Brown & Co., Chicago office, and is widely known in the St. Louis and Chicago territories, which he has covered for 30 years. Bauer-Wilson & Bateman are succeeding to the business of Bauer-Wilson & Co., sales agents, following the recent death of Thomas L. Wilson, a partner, who with Fred W. Bauer organized the firm in April, 1932. Bauer-Wilson & Bateman will continue to represent their present connections as sales agents for producers of Northern, Southern, low phosphorus and charcoal pig iron, alloys, fluorspar, and by-product foundry, crushed and heating coke.



E. A. BATEMAN



A. D. HUNT

ANDREW D. HUNT has been appointed manager of engineering of the South Philadelphia works, Westinghouse Electric & Mfg. Co. His career has embraced wide experience in practical engineering. After having been graduated from Cornell University in 1905, he became engaged in railway survey work with Westinghouse, Church, Kerr & Co., and for the next five years his work involved irrigation and water problems. In 1910 he joined the Alberger Pump & Condenser Co., and in 1919 became associated with the marine sales force of the Westinghouse company, in charge of the marine section of the service department at the South Philadelphia works. He was appointed manager of steam service in 1920, and in 1926 became manager of engineering, the position he now holds. In June, 1931, Mr. Hunt was transferred temporarily to the company's Chicago office as steam specialist for the Northwestern district. He was recalled to the South Philadelphia works in 1932 to fill again the position of steam service manager before resuming his duties as manager of engineering.

WILLIAM A. AYRES, member of Congress from Kansas for nearly 20 years, has been appointed by President Roosevelt a member of the Federal Trade Commission. He fills the vacancy created by the resignation of Commissioner James M. Landis, who is now a member of the Securities and Exchange Commission. The term for

which Commissioner Ayres is appointed will expire in September, 1940.

ERNEST A. EARLE, heretofore general manager of the Buffalo plant and Eastern representative of the Arrowhead Steel Products Co., Minneapolis, has been appointed sales representative in Pennsylvania, New York and the New England States for the industrial division of Aluminum Industries, Inc., Cincinnati. He will make his headquarters at 344 Stillwell Avenue, Buffalo. Prior to his connection with the Arrowhead company, which he also served as chief engineer of the main plant at Minneapolis, Mr. Earle was identified with the Western Electric Co., Chicago, as designing engineer.

HENRY M. CHASE, who entered the engineering department of the Halyoke works of the Worthington Pump & Machinery Corp. (then the Deane Steam Pump Co.) on June 17, 1891, and with the exception of about a year

spent with the De La Vergne Mfg. Co. has been continuously identified with the Worthington company, has resigned from the engineering staff. During that time he has served the company in various capacities from detail draftsman to chief engineer and consulting engineer. He was graduated from Massachusetts Institute of Technology in 1891.

P. H. BIRCKHEAD has been made general sales manager of the Bucyrus-Erie Co., South Milwaukee, in charge of domestic and foreign sales. C. S. WAGNER has become associated with the company as manager of the commercial department, in charge of sales promotion, publicity, orders, claims and adjustments and field direction. He was formerly a vice-president of the Koehring Co., Milwaukee. M. J. WOODHULL has been named manager of large machine sales; J. A. GARBER, small machine sales; J. B. BIRCKHEAD, drill and Loadmaster sales; M. F. KEESE, dredge sales; R. T. CRAIG, foreign and export sales; B. F. JOHNSTON, repair sales.

LEWIS L. BREDIN, formerly manager of the screen division of the Chamberlain Metal Weather Strip Co., Inc., Detroit, has been elected president of the company. A graduate of Yale, Mr. Bredin joined the company in 1919 and spent considerable time in the various departments. His father, Charles H. Bredin, was one of the organizers of the company in 1897 and president of the company from 1910 up to the time of his death on July 10.

C. H. BRUSHABER, formerly president of the Brushaber Steel Co., New York, has been made manager of the raw materials department of Otto Kafka, Inc., New York. S. NAGANUMA, who has been general manager of Mitsubishi Shoji Kaisha, Ltd., has become manager of the Far East department, and S. A. MAGRILL, formerly with Lunham & Moore, has been made manager of the order and traffic department.

ROY H. FAULKNER, formerly vice-president in charge of sales for the Pierce-Arrow Motor Car Co., has been appointed president of the Auburn Automobile Co. He was with the Auburn company from 1923 to 1931 as sales manager, vice-president and president. He left Auburn in 1931 to join the Studebaker organization and more recently was identified with Pierce-Arrow.

GEORGE R. SULLIVAN, representative in the Philadelphia district of the Hanna Furnace Corp. for the sale of foundry pig iron, silvery and ferrosilicon, has removed his offices from 1242 Commercial Trust Building to 1514 Lincoln-Liberty Building, Philadelphia.

OBITUARY

JOHN A. TOPPING, former chairman of the board, Republic Iron & Steel Co., died of pneumonia at his home in Greenwich, Conn., on Aug. 24. He was born in St. Clairsville, Ohio, on June 10, 1860. After attending grammar and high schools in Kansas City, Mr. Topping for a short time held a job as clerk in a bank. He started in the iron and steel business in 1878 as a payroll clerk with the Aetna Iron & Nail Co., and became its president in 1898. Later the company was merged with another to become the Aetna-Standard Iron & Steel Co., and this in turn went into another merger and became a part of the American Sheet Steel Co., of which Mr. Topping was first vice-president. He resigned in 1903 and undertook the reorganization of the La Belle Iron Works. In July, 1904, he was elected president of the American Sheet & Tin Plate Co., remaining in that position until January, 1906, when he was made president of the Republic Iron & Steel Co., and chairman of the Tennessee Coal, Iron & Railroad Co. He was made chairman of the Republic company in 1908 and continued in that capacity for nearly 22 years. He retired from active business in December, 1929, at the time of the formation of the Republic Steel Corp'n.

Throughout his career, Mr. Topping took an active part in the affairs of the American Iron and Steel Institute, of which he was at one time vice-president.

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JAMES L. GOUGH, founder of the Federal Machinery Sales Co., Chicago, died Aug. 20, at Tampa, Fla., aged 59 years. Previous to founding the Federal company Mr. Gough was sales manager for the Marshall & Huschart Machinery Co., Chicago, and the Essley Machinery Co., Chicago. Ill health necessitated his resignation from the Federal company, and for a time he lived in New Orleans, returning to Chicago to reengage in the machinery sales business, only to find that his health would not permit this move and he was again forced to retire to the South.

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DAVID E. FERGUSON, vice-president, H. K. Porter Co., Pittsburgh, died on Aug. 20. He was formerly purchasing agent for the company, and became vice-president when the concern was reorganized.

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EDWARD CHARLES MEISSNER, inventor of a pneumatic hammer and pneumatic drill and holder of a basic patent on a pneumatic riveter, died recently at his estate on the Missis-



JOHN A. TOPPING

sippi River bluffs, near St. Louis, following an illness of a year. He was 60 years old. After his graduation from Washington University in 1892, he entered the field of technical engineering. In recent years he had been connected with the Fidelity Mutual Insurance Co.

♦ ♦ ♦

ROBERT P. KEENOY, formerly superintendent of transportation, American Steel & Wire Co., Donora, Pa., died at his home at Pittsburgh on Aug. 24. He

assumed the position with the American Steel & Wire Co. in 1902, remaining there until 1925, when he became vice-president and general superintendent of the Donora Southern Railroad.

♦ ♦ ♦

FREDERICK H. MILLER, pioneer Milwaukee industrialist, died Aug. 15, aged 78 years. He was born in Milwaukee and in 1887, with W. A. Lamp, founded the Lamp & Miller Mfg. Co., brass founder, being active in the business until he retired four months ago because of illness.

♦ ♦ ♦

WILLIAM T. SHEPARD, former vice-president of the Rogers-Brown Iron Works, died at his home in Santa Barbara, Cal., on Aug. 18. More than a decade ago Mr. Shepard retired from active business to live in California.

♦ ♦ ♦

JOHN WHITWORTH, for 30 years vice-president of the Oliver Type-writer Co., died Aug. 25 at his home in Woodstock, Ill. He was born of English parents in St. Petersburg, Russia, where his father established a tool manufacturing concern. He went to Chicago as a young man and first entered the bicycle manufacturing field. He retired from business eight years ago.

Seeks Detroit Base On Bars and Strip

AN effort to revive the controversial subject of a Detroit base on Detroit produced steel products is being made by the Rotary Electric Steel Co., a Detroit steel producer, in asking the American Iron and Steel Institute (the Code Authority) to establish Detroit as a basing point for merchant steel bars, cold rolled bars, and cold rolled strip steel.

Of course, large steel users in Detroit are ready to receive this proposal with open arms. Certain ones of them have been advocating it for months and have declared privately that they will not be satisfied until they get it, because they assume that prices filed at Detroit as a basing point would be substantially lower than the delivered prices now quoted. It does not necessarily follow, however, that such would be the case.

Steel consumers in the State outside the Detroit district are lukewarm, if not openly hostile, to the plan, because they realize that if lower prices were to be filed at Detroit as a basing point than present delivered prices, they would be handicapped in competition with competitors in that dis-

trict. Under the system of delivered prices now prevailing, one steel user outside the Detroit district is paying only \$1.00 a ton more than its Detroit competitor, while under a system of Detroit basing prices, he cannot be certain what the differential would be.

This fact illustrates the extent to which establishing Detroit as a basing point might seriously disrupt existing competitive conditions among consumers of steel.

Another telling argument against establishing of Detroit as a basing point is the fact that only a small percentage of the steel consumed in this district can be produced locally. On the other hand, places named as basing points under the Code are, in general, points where output substantially exceeds consumption.

It appears likely that the request for Detroit as a basing point will not be granted at this time, especially in view of the study of the basing points problem in the industry now under way by Government agencies and concerning which no conclusions are probable for several months.

Walsh Body & Equipment Co., 200 Bent Street, Cambridge, Mass., has been organized to succeed the Perin Walsh Co.



THE WEEK IN WASHINGTON

The Cards Are Still Sticking on the Potomac

*Big Fall Shuffle Is Postponed While New Dealers Have a Laugh on
The American Liberty League—NRA Reorganization Now
Due in Two Weeks—Coordination Popular*

WASHINGTON, Aug. 28.—It may be the hot summer weather on the Potomac that makes the cards stick together. It's also possible that some of the dealers want a rest. They might even be looking around for some new packs. The old deck's a little worn in spots. At any rate, the much promised fall shuffling has been postponed again.

The President has temporarily assumed the role of a country squire on his Hyde Park acres. General Johnson has gone to the seashore. Secretary Wallace is around, but is busy explaining that the country really needs a merchant marine after all. He was only kidding. We need farmers worse, but a few boats might come in handy some time in case of war or something like that.

Secretary Roper is in a reassuring mood, but hasn't said enough nice things about big business to risk being called a Tory. Secretary Ickes is thinking about big new political parties that really stand for something. Relief Administrator Hopkins is discouraged about keeping 15,000,000 people on a permanent dole. He just returned from Europe where they do things better anyhow.

Madame Perkins is silent, but has ideas about the NRA. Donald Richberg, coordinator extraordinary, wasn't really mad at the General. Their time pieces just didn't happen to agree. Secretary Morgenthau is through with inflation until everyone understands about silver. We can

* Substituting for resident Washington editor on vacation.

By T. H. GERKEN*
News Editor, The Iron Age

keep our knives and forks! Has anybody seen Mr. Garner?

Collectively, the New Dealers are all having a tremendous laugh at the expense of the American Liberty League which was old-fashioned enough to start talking about the constitution on its very date of birth. Why should anyone care about private property?

New Deal to Be Coordinated

They started paging both Hercules and Solomon last week when the big news came out about coordinating all new deal activities. It seems that the idea has been around for some time, but no one started doing anything about it until Donald Richberg got up a report.

This Richberg report is purely factual, but will form the background of coordination. The activities of the NRA and the AAA will be reconciled. No longer will the price of hogs go up faster than underwear and shoes. The days when pay envelopes didn't fatten as rapidly as grocery bills will be gone forever.

Coordination will also be extended to the other alphabetical agencies, including housing, relief and public works. It may even reduce expenses a little, but the Federal payrolls won't be cut down before November even if

it is found that several people are doing the same thing in Washington.

It is also hoped that conflicts between the NRA, the Federal Trade Commission and the Department of Justice can be eliminated. Senator Borah will be consulted, but not be asked to give up his Senate seat to act as coordinator. It is also unlikely that Clarence Darrow will again be called into consultation over the patient. His bedside manner lacks subtlety.

Making Plans for Congress

Behind all of this coordination are the plans of the New Deal of the future. The National Industrial Recovery Act expires next June. So does much of the other legislation under which the New Dealers work and which was originally labeled "emergency." The country can't exist forever in a state of emergency and the Roosevelt program must achieve some semblance of permanence if it is to have a fair chance. The next Congress will be expected to provide legislation of a permanent nature. It won't be so easy next January as it was in the spring of 1933. The New Deal policies have lost some of their glamour with voters as well as with their emissaries on the Potomac. The recent State primaries have not all been cheerful reading, even for General Farley.

A Permanent NRA

The nation's industry is naturally most interested in the fate of the NRA. Announcement of a reorganization of this administration had been

generally expected at the end of last week before the President left for Hyde Park. Reports of a disagreement among General Johnson, Secretary Perkins and Mr. Richberg, to whom have been entrusted the burden of the reorganization, were consistently denied by all concerned and the General finally set everything right by slapping Mr. Richberg on the back in the presence of newspaper reporters. The reconciliation with Miss Perkins was not a public event, but must have been equally convincing. The fact remains that the General hasn't been in the best possible humor and it was even necessary for President Roosevelt to assure a breathless public that the worthy Administrator for National Recovery had no immediate intention of retiring.

The President's statement on Friday that the NRA reorganization would be delayed at least two weeks was further amplified by the fact that such reorganization would be of a temporary character only—temporary in that the revised set-up would endure only until the next Congress brings forth legislation which will enable the establishing of some sort of a similar permanent body. This feature of the New Deal, then, is to stay; at least if the Congress can be made to see and understand its lasting value.

Opinion persists that the military type of organization as sponsored by General Johnson will prevail in the NRA shuffle. This calls for a board of probably five members, each of whom would be responsible for a single phase of administration. The General would apparently sit on this board as its chairman and final arbiter. Madame Perkins and Mr. Richberg, according to some reports, are not so sure this would be the best idea. They would not deprive him of his seat at the board table, but would allow the entire board to act as a group in determining the policies of administration. Seemingly the General is not so anxious to see his lusty offspring entrusted to the guidance of an unwieldy board. He usually gets what he wants.

The General Rebuked

Another event of the week which was not calculated to improve the General's disposition was the return to work of one John L. Donovan, a former clerk of the Labor Advisory Board of the NRA, whose employment was ended suddenly on June 30 by none other than General Johnson himself. In addition to his NRA duties, Mr. Donovan served as president of the NRA local union, affiliated with the American Federation of Government Employees. The General contended last June that these latter duties were absorbing too much of Mr. Donovan's time. The National Labor Relations Board last week ruled otherwise and gave General Johnson a gentle tap on the wrist for having violated Section 7A of the recovery act. The labor relations board did admit that

Mr. Donovan's actions had not always been polite, but insisted that they had been taken in the heat of emotion and should be excused. It is not known whether or not the General conveyed his excuses personally. At any rate Section 7A was upheld, and it is only to be hoped that actions taken by labor leaders in the "heat of emotion" will not grow more impolite in the future.

Secretary Roper Reassuring

Business men were given the shock of their radio-listening lives the other evening when Secretary Roper was heard to utter the obsolescent word, "boom." Quick dictionary consultation helped a little. "If business courage," said Mr. Roper, "were equal to business statistics, we would be in need of controlling a real business boom." His eager listeners went back over the July and August statistics of their own immediate businesses, but still didn't feel like going out to hunt lions. Two or three steel executives even cancelled their usual autumn rabbit hunts. At any rate, it was pleasant to hear someone use that word "boom" again.

Mr. Roper's remarks were evidently intended to be reassuring to business, but were far too mild to offset other recent administration utterances, particularly the President's Green Bay speech. "The Roosevelt administration," the Commerce Secretary went on to say, "believes in just profits for management and capital and an equitable return to labor." The adjectives are scarcely specific. While he went on to flay those critics of the administration who make subtle suggestions that the profit motive in American life has been abolished, a great part of the address was devoted to his recent trip to Alaska. With the National Parks and the country's extra-territorial possessions all coming in for their share of radio publicity, the people who tune in will soon become travel-minded if not prosperous enough to take the trips.

The President's own statement that he found business much better than he expected upon his return from Hawaii was not exactly revealing. Announcement by the Treasury Department that no immediate plans for inflation are in prospect may also have been reassuring to some, but the picture may change over night. The prospect of gold devaluation by France before the end of the year is a disturbing factor in the international world of finance, and the effects of such possible action upon our own fiscal policy are being studied carefully.

Organized Opposition to the New Deal

Although the announcement of the formation of the American Liberty League may have provided superficial amusement for administration leaders, they are said to be privately concerned regarding its possible growth. As the

first attempt to organize non-partisan opposition to the New Deal policies, the league is unquestionably significant. Headed by Jouett Shouse, formerly high in the ranks of the Democratic party, and already numbering two former Democratic presidential candidates among its membership, the organization is rapidly attracting prominent men into its ranks.

By the time the next Congress convenes, the league should have acquired considerable support. Its influence will certainly be used against the passage of damaging legislation, and, as pointed out by two members of the cabinet, it may form the nucleus for new political alignments which will mean far more than the present great American parties.

Iron and Steel Exports Higher During July

WASHINGTON, Aug. 28.—Totaling 233,186 gross tons, exports of iron and steel products in July were 13,780 tons greater than in June. July trade fell short, however, of the exports reported for March (261,269 tons) and for May (241,753 tons). Exports over the elapsed seven months of 1934 have amounted to 1,486,360 tons or approximately two and one-half times the 606,030 tons exported in the corresponding period of 1933.

Scrap exports, 155,812 tons, were the second largest ever recorded, being exceeded only by the 173,165-ton trade of March. Tin plate exports—13,960 tons—were smaller than in any of the first three months of 1934 although they were higher than in any of the second three. Skelp shipments constituted the third largest item in the July trade, 9665 tons, followed in turn by black steel sheets, 7670 tons, and galvanized steel sheets, 5551 tons.

Japan was as usual the leading buyer of American iron and steel products in July, her total of 104,001 tons was the largest ever recorded for a single month but included 101,293 tons of scrap. Next was Canada with a trade totaling 23,759 tons, followed by Italy with 22,169 tons, Poland and Danzig with 18,494 tons, and Mexico with 9404 tons.

The expansion of cast bearing bronzes at temperatures between 68 and 392 deg. F. has recently been investigated by Peter Hidnert, and is the subject of research paper RP665 of the Bureau of Standards. The samples of the bearing bronzes were supplied by the Bunting Brass & Bronze Co., Toledo, Ohio, and included leaded bronzes. In short, they covered a series of alloys of comparatively high melting points and strength. A pamphlet copy of the report may be obtained from the Superintendent of Public Documents, Washington, at 5 cents a copy.

Private Builders and Navy Yards Share In Awards of 24 Naval Vessels

WASHINGTON, Aug. 28.—Awards of 24 naval vessels, which will require more than 40,000 tons of steel, were announced last week by Henry L. Roosevelt, acting Secretary of the Navy. Eleven of these vessels will be built by private companies, while the remaining 13 were allocated to navy yards. Awards to private builders were as follows:

One light cruiser, 10,000 tons, to Newport News Shipbuilding & Dry Dock Co., Newport News, Va., for \$11,650,000. One light cruiser, 10,000 tons, to New York Shipbuilding Corp., Camden, N. J., for \$11,975,000. Two heavy destroyers, 1850 tons each, to Federal Shipbuilding & Dry Dock Co., Kearny, N. J., for \$3,964,000 each. Two light destroyers, 1500 tons each, to Bethlehem Shipbuilding Corp., Quincy, Mass., for \$3,784,000 each. Two light destroyers, 1500 tons each, to United Shipbuilding & Dry Dock Co., New York, for \$3,430,000 each. Three submarines, about 1300 tons each, to Electric Boat Co., Groton, Conn., for \$2,387,000 each.

Allocations to navy yards were as follows: One light cruiser to New York; one heavy cruiser to Philadelphia; two submarines to Portsmouth, N. H.; two light destroyers to Boston; two light destroyers to Puget Sound, Wash.; three light destroyers to Norfolk, and one light destroyer and one submarine to Mare Island, Cal.

Awards and allocations in all cases were made in accordance with contract plans prepared by the Navy Department except in the case of two destroyers awarded to the Bethlehem Shipbuilding Corp., which design was prepared by that corporation.

When the 24 vessels of this year's program and those already under construction are completed the Navy will still need 78 ships of various classes to bring it up to the authorized strength provided in the London Naval Treaty of 1930. They include one aircraft carrier, two light cruisers, 51 destroyers and 24 submarines.

Code Doings and Undoings

Die Forging Code Hearing

A CODE of fair competition proposed for the open die forging industry by the Forging Manufacturers' Association was considered at a public hearing Aug. 22.

The code as revised would fix maximum hours at 40 per week, or 48 hr. during "unusual or peak demands." Watchmen and janitors would be limited to 56, and firemen to 45 hr. per week. Maintenance and delivery workers would be permitted to work 10 per cent in excess of the basic maximum hours. Proposed minimum wages range from 40c. per hr. in the larger cities of the East and Middle West, down to 25c. per hr. in the southern district. Clerical and office employees would receive a minimum wage of \$15 per week.

Numerous fair trade practice provisions are included in the proposed code, and provision is made for the promulgation of other trade practices for local areas in sections where such agreements are desired.

Gilbert H. Montague, counsel for the Midvale Co., Philadelphia, suggested a number of clarifying amendments to the code and indicated, particularly, a desire to change the labor provisions in order to parallel more closely labor provisions of the M.A.P.I. code. In response to a telegram from the Fabricated Metal Products Federation, which was read into the record by the presiding deputy, James Kerwin, of the Pennsylvania Forge Co., Philadelphia, it was said the code was intended to cover only iron and steel forgings and would not interfere with brass forging manufacturers.

J. B. Clough, representing the Johnston & Jennings Co., Cleveland, a non-association member of the industry, was given

a one-week period in which to file a brief. He had charged he was not given sufficient notice of the revised code.

Hoisting Engines

THE hoisting engine manufacturing division of the machinery and allied products industry has submitted a proposed modification of the industry's approved code. The proposed amendment would empower the code authority to collect assessments for code expenses from members of the industry and to make the necessary expenditures called for under a budget. All objections to the proposed modification must be submitted to room 510, 1518 K Street, N.W., Washington, before Sept. 4.

Steel Plate Fabricating

THE code authority for the steel plate fabricating industry has submitted a petition to the NRA, asking for termination of the exemption contained in Administrative Order X-36, of May 26, 1934, as applied to its industry. This order now exempts from contributing to the budget of the steel plate fabricating industry all members thereof whose principal line of business is embraced in a trade or industry subject to a code other than that for the industry mentioned.

Shovel, Dragline and Crane

THE code authority for the shovel, dragline and crane industry has applied to the NRA for a modification of its approved code. The amendments proposed deal with code administration expense. They would empower the code authority

to submit a budget and a basis of contribution from members of the industry for the support of same, and to collect assessments from industry members and make the expenditures called for under the budget. Any objections to the proposed code modification must be submitted to room 402, 1518 K Street, N.W., Washington, before Sept. 5.

Electro-Plating and Metal Polishing and Metal Finishing

APPROVAL of a supplemental code for the electro-plating and metal polishing and metal finishing industry, a division of the fabricated metal products manufacturing and metal finishing and metal coating industry, to become effective Sept. 1, has been announced. The code includes the basic 40-hour work week of the fabricated metal products code, as well as the hourly wage rates of 40c. for men and 35c. for women in the North, and 35c. and 30c. respectively in the South.

Special Tool, Die and Machine Shop

THE code authority for the special tool, die and machine shop industry has applied to the NRA for termination of the exemption granted by Administrative Order X-36, which relieves members of an industry from the necessity of contributing to the cost of code maintenance, except for the code which covers their principal line of business. The industry holds that manufacturers who compete with the special tool, die and machine shop industry should be required to contribute to the code fund irrespective of whether their major line of business is covered by the tool, die and machine shop code.

Pipe Tool Manufacturing Industry

NRA approval of a supplementary code for the pipe tool manufacturing industry has been announced. The industry is a division of the fabricated metal products manufacturing and metal finishing and metal coating industry, for which a master code was approved Nov. 2, 1933. The code is to be administered by a body of five members, to be elected at a meeting of the industry. It includes fair trade practice rules proposed by the industry to control certain policies which have prevailed in the past. This supplementary code will go into effect on Sept. 3.

Porcelain Enameling Manufacturing

THE code authority for the porcelain enameling manufacturing industry, a subdivision of the fabricated metal products manufacturing and metal finishing and coating industry, has made application to the NRA for approval of a uniform method of cost finding and estimating for the jobbing shop subdivision of the industry. Notice has been given that a public hearing will be conducted on this application Aug. 31, 1934, in the Carlton Hotel, Washington.

Code Authorities Approved

APPROVAL of the following persons as the code authority for the foundry equipment industry has been announced: S. C. Vessy, Cleveland; R. S. Hammond, Harvey, Ill.; F. R. Wallace, Philadelphia; E. O. Beardsley, Chicago; T. W. Pangborn, Hagerstown, Md.; D. A. Weber,

Fort Wayne, Ind.; E. A. Pridmore, Chicago; V. E. Minich, Mishawaka, Ind.; and H. S. Simpson, Chicago.

Supplementary Code Authorities Recognized

THE NRA has announced its approval of the method of selecting the members of three divisional code authorities, and its recognition of the following as the duly chosen members:

Jack Manufacturing (subdivision of the machinery and allied products industry): E. J. Griffiths, Duff-Norton Mfg. Co., Pittsburgh; M. H. Bridge, Joyce-Gridland Co., Dayton, Ohio; F. W. Krickhan, Templeton, Kenley & Co., Ltd., Chicago; and H. M. Sloan, Buda Co., Harvey, Ill.

Locomotive Manufacturing (subdivision of machinery and allied products industry): H. B. Ayers, H. K. Porter Co., Pittsburgh; R. P. McColl, McIntosh & Seymour Corp., Auburn, N. Y.; H. H. Perry, Whitcomb Locomotive Works, Rochelle, Ill.; C. E. Heath, Fate-Root-Heath Co., Plymouth, Ohio; S. D. Wright, Atlas Car & Mfg. Co., Cleveland; and George W. Alcock, Lima Locomotive Works, New York, N. Y.

Galvanized Ware Manufacturing (subdivision of fabricated metal products manufacturing and metal finishing and metal coating industry): A. J. Kleckhefer, National Enameling & Stamping Co., Milwaukee; J. O. Entrekli, Wheeling Corrugating Co., Wheeling, W. Va.; R. G. Harrison, Reeves Mfg. Co., Dover, Ohio; A. S. Kendall, Crundin Martin Mfg. Co., St. Louis, Mo.; and Henry Horn, New York Standard Mfg. Co., Brooklyn.

Administration Members Named

THE following have been appointed administration members to divisional code authorities as follows:

Boat building and boat repairing industry (South Atlantic division)—Saxon W. Holt, Newport News, Va.

Diesel engine manufacturing industry (a MAPI division)—Daniel L. Morris, New York patent attorney.

Metal lath manufacturing industry—Prof. D. J. Duncan, of Northwestern University, Evanston, Ill.

Secondary aluminum industry—John Hopp, Chicago metallurgical engineer.

Navy Asks For F.O.B. Mill Bids on Steel

WASHINGTON, Aug. 28.—The Bureau of Supplies and Accounts, Navy Department, has asked for bids up to Sept. 4 on 132,000 lb. of plates, with no delivery point specified. Quotations on an f.o.b. shipping point basis are required.

Under the iron and steel code delivered prices only may be quoted and the purchase of this steel would test the validity of Administrative Order X-48 as applied to the steel code. This order is construed by some departments of the Government as permitting code members to quote f.o.b. mill prices to Federal agencies.

To Discuss Die Castings And Slag Control

SLAG control in the ferrous field and die castings in the non-ferrous field will feature discussions of the fall meeting (scheduled for Oct. 2, 3 and 4, at the Hotel Pennsylvania, New York), of the Institute of Metals and the iron and steel divisions of the American Institute of Mining and Metallurgical Engineers.

Consideration of the subject of slag control will be in the nature of a symposium, to be held Oct. 4, with the following among the speakers: L. F. Reinartz, American Rolling Mill Co., and chairman of the iron and steel division, on rimming steel; W. J. Reagan, on high-carbon steel; A. F. Miller and T. S. Washburn, on recarburized rail steel; F. B. Foley and M. Furness, on acid open-hearth steel; C. H. Herty, Jr., and A. B. Kinzel, on chemical and physical tests for slag control.

The die castings sessions are to be held Oct. 3 and they will provide for these papers: Mechanical properties and corrosion resistance of aluminum-alloy die castings, by E. H. Dix, Jr., and J. J. Bowman; die casting of brass, by John R. Freeman, Jr.; aging of zinc alloy die castings, by M. L.

Fuller and R. L. Wilcox; role of the spectrograph in the control of die castings production, by T. A. Wright; steels for die casting dies, by Sam Tour, vice-president, Lucius Pitkin, Inc., New York, and die casting of brass, by O. B. Malin and W. W. Sieg.

A joint session of the two divisions on the afternoon of Oct. 2 will be devoted to metallography, with papers as follows: Orientation of ferrite in pearlite, by Robert F. Mehl and D. W. Smith; polarizing microscope for studying inclusions, by S. L. Hoyt and M. A. Scheil; graphite in low-carbon steel, by A. B. Kinzel and R. W. Moore.

Raw materials will be touched on in a session of the iron and steel division, on the morning of Oct. 3. The blast furnace from 6000 B. C., by Charles Hart, and the manufacture, properties and uses of sponge iron, by Dr. George B. Waterhouse, are the papers announced.

A joint dinner on Oct. 3 will be addressed by Sam Tour, on die casting. Sessions on equilibrium diagrams and on theoretical metallurgy are also scheduled for the non-ferrous division.

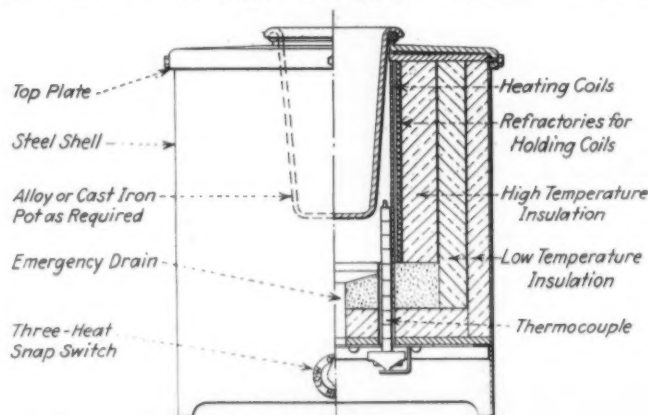
Electric Pot Furnace for Melting and Heat-treating

FOR heat-treating of small parts, as in salt baths, but also for melting work, the Hevi Duty Electric Co., Milwaukee, has put on the market a line of pot furnaces of both the round and rectangular shapes. As indicated from the accompanying cross-sectional sketch, emphasis has been placed on insulation, which includes both high and low temperature slab material. Leaks to the furnace chamber are sealed off at the top of the pot by means of a sealing rope, and the top plate is of ribbed alloy cast iron, likewise insulated to prevent heat loss. The effort has been to provide rugged

construction and the outer shell is of steel plate.

The heating elements are of the helical coil type, made of heavy wire of nickel-chromium composition, and they are mounted on radiant refractories to reflect and radiate the heat to the furnace pot. Incidentally, the pots for melting are arranged for ready removal for ease in pouring.

A three-snap switch provides for three levels of temperature. For example, a furnace which takes 5000 watts on the high input, developing a temperature of 1500 deg. F. or core, takes 2500 watts at the medium position, for a temperature of 1100 deg., and 1250 watts on low for a temperature of 750 deg.



CONSTRUCTION of the Rectangular Hevi-Duty electric pot furnace, which is made with a pot as large as 7x7 in. and 13 in. deep.

Wire Association Meets As Part of Metal Congress

THE Wire Association will hold a meeting in New York at the time of the National Metal Congress, with technical sessions at the Hotel New Yorker on Oct. 2, 3 and 4. The program as announced by Richard E. Brown, 17 East Forty-second Street, New York, secretary, calls for two papers per session and time for extended open discussions and the interchange of experience.

A list of the papers includes the following: Corrosion and hot galvanizing, one by Allan B. Dove, chemical engineer, Steel Co. of Canada, Hamilton, Ont., and the other by U. C. Tainton, consulting engineer, Baltimore. Bright annealing of wire, by O. S. Haskell, industrial heating engineering department, General Electric Co., Schenectady, N. Y. Wire manufacturing processes, illustrated by motion pictures, by F. H. Nullmeyer, superintendent, rod, wire and conduit department, Youngstown Sheet & Tube Co., Youngstown. Braiding and other wire covering, one by S. B. Blaisdell, Fidelity Machine Co., Philadelphia; another by Robert W. Withington, president, American Insulating Machinery Co., Philadelphia, and a third by R. V. Olsen, vice-president, Mossberg Pressed Steel Corp., Attleboro, Mass. Spring wire by E. J. P. Fisher, physical metallurgist, Keystone Steel & Wire Co., Peoria, Ill. Coating of rods, by H. G. Hobbs, Cleveland.

John Mordica, superintendent, rod and wire mill, Bethlehem Steel Co., Sparrows Point, Md., is president of the association. Frederick A. Westphal, superintendent, wire mills, Shef-

field Steel Co., Kansas City, Mo.; Paul R. Fast, superintendent, Belden Mfg. Co., Chicago; P. W. Grassell, president, Wilson Steel & Wire Co., Chicago; H. W. Anderson, president, Fidelity Machine Co., Philadelphia; Dr. S. A. Braley, industrial fellow, Mellon Institute of Industrial Research, Pittsburgh, and M. A. Kent, assistant general works manager, General Cable Corp., White Plains, N. Y., will serve as chairman of the sessions.

Electrochemists' Meeting In New York in September

FURTHER details have been received regarding the meeting of the Electrochemical Society to be held in New York at the Hotel Pennsylvania, Sept. 27, 28 and 29. In THE IRON AGE of Aug. 2, page 80, were listed papers to be presented in a session on the electrochemistry of the rare elements. This is to be held on the morning of Sept. 27, and James H. Critchett, of the Electrometallurgical Co., will preside.

The session on the morning of Sept. 28 will include papers on the electrochemistry of life processes and that for the morning of Sept. 29 will be devoted to electrodeposition. The afternoons are set aside for plant visitations, and among those scheduled are the General Electric Vapor Lamp Co., Hoboken, N. J.; Philip Sievering, Inc., New York; the Westinghouse Lamp Co., Bloomfield, N. J.; the General Ceramics Co., Keasbey, N. J., and the Standard Oil Development Co., Bayway, N. J.

Among papers not hitherto men-

tioned in these columns are the following:

Bullard-Dunn electrochemical metal descaling process, by Dr. Collin G. Fink and T. H. Wilber.

Current conducting properties of slags in electric furnaces, by Axel Wejnarth.

The temperature-history and rate of heat loss of an electrically heated slab, by Albert B. Newman and Louis Green.

Boron carbide, a new crystalline abrasive and wear-resisting product, by R. R. Ridgway.

Improved method of electric furnace technique, by M. A. Baernstein.

Rate of the corrosion of zinc, by J. E. Maconachie.

Heat treatment and the corrosion of high-purity aluminum, by F. A. Rohrman.

Deposition of tungsten and iron from aqueous solutions, by M. Leslie Holt.

Cincinnati District Mills at Low Rate

CINCINNATI, Aug. 28.—The pig iron market is featureless. Here and there inquiries from substantial melters stimulate hopes of good September business. The melt continues to be low, but foundries have numerous fall prospects.

Fresh sheet bookings have dipped even lower. Automotive demand is almost negligible, while miscellaneous orders reflect the extreme conservatism of users. The leading interest is alternating schedules in its various units. On the whole, production, the past week, did not exceed 20 per cent of capacity, and new business does not warrant any increase this week.

Domestic grades of coke are in the usual seasonal spurt, but foundry coke is noticeably quiet. Both sales and shipments for industrial use are low.

Mill interest in scrap is nil. Most users are carrying heavy inventories and are not interested in new purchases except at bargain prices.

Work on the fluidity of slags, done under a cooperative agreement between the United States Bureau of Mines, the Carnegie Institute of Technology and the Metallurgical Advisory Board, has been described at length in report 3232 of the bureau by Dr. C. H. Herty, Jr., F. A. Hartgen, G. L. Frear and M. B. Royer. It covers in detail the temperature-viscosity measurement of the lime-silica and the lime-silica-calcium fluoride systems.

Bench lathes and attachments made by the Pratt & Whitney Co., Hartford, Conn., are described in a well-illustrated 15-page booklet issued recently by the company. Data on the new motor drive and two-speed gear box are included.

Who do you work for—who pays your wages or your salary?

Certainly not the company or the institution where you do your work, be it sweeping or managing.

You may think your boss is hard and unappreciative but he does not furnish the money and he has but little to say as to how much you are to be paid.

You and he and I, all of us, work for the public—the customer—the hardest, least appreciative of all masters.

If we have a strike, or a strike elsewhere, or a fire or flood interferes with our source of material, or if

we cannot manage to make prompt deliveries or sell at competitive prices for any cause, there are a hundred or a thousand competitors ready to take our business and we must hunt for new outlets (a slow process) or we must fail.

Do not forget that you and I, all of us, work for a hard master and that he and our competitors set the price of our goods and hence the limits of all salaries and wages.

Hardly anyone can do as he or she pleases.

**F. W. Jessop, President
Ohio Electric Mfg. Co.
Cleveland**

Republic Steel, The Corrigan, McKinney, Truscon Steel Plan to Consolidate

ONE of the largest consolidations of prominent steel companies undertaken in several years, involving the Republic Steel Corpn., the third largest producer in the country, and the important properties of the Corrigan, McKinney Steel Co., was approved at meetings of the boards of directors of both companies held Aug. 27, subject to ratification by the stockholders. Details of the terms and other essential factors in the plan were announced jointly by T. M. Girdler, chairman of Republic, and Donald B. Gillies, president of Corrigan, McKinney.

Republic's plans also contemplate readjustment of the corporation's capital structure, and \$24,000,000 of new financing for the combined companies.

The enlarged enterprise which is a demonstration of the faith of Republic's management in the future of the industry, will have assets of approximately \$323,000,000 and a combined steel ingot producing capacity of approximately 6,000,000 tons annually.

Republic Steel Corpn. directors simultaneously entered into an agreement with leading executives and directors of Truscon Steel Co. under which the latter will accept securities of Republic Steel Corpn. in exchange for their Truscon holdings, after consummation of the acquisition of the Corrigan, McKinney properties. This offer, on similar terms, is open to all Truscon stockholders, but is contingent upon acceptance by holders of 75 per cent of Truscon stock.

The essential features of the proposed changes in Republic's capital structure, in addition to its simplification, are that they will eliminate all dividend arrears on the outstanding preferred stock; reduce the amount of the preferred stock outstanding; permit \$24,000,000 of new financing, the proceeds of which will be used to retire the present outstanding refunding and general mortgage; repay existing bank loans, and provide additional working capital for the consolidated properties.

These steps, in the opinion of the

directors, will place both the preferred and common stockholders of Republic Steel Corpn. in a more advantageous position in respect to future earnings of the company than under the existing capital set-up. They will also be more adapted to the present and future requirements of the enlarged corporation.

Special Meeting on Oct. 30

A special stockholders' meeting of Republic Steel Corpn. has been called for Oct. 30, at which stockholders of record at the close of business Oct. 6 will have the right to vote.

Each of the proposals to be submitted to stockholders for their approval at the special meeting is an integral part of the plan as a whole, and no one proposal can be carried out unless all are ratified.

The proposals involving important changes in Republic's financial structure to be submitted to stockholders for their approval are:

(a) To amend the certificate of incorporation of Republic so as to create a new

Plants, Products and Properties of Republic Steel Corpn. and Subsidiaries

Executive Offices, Cleveland

COMPANIES OWNED IN PART

Donner-Hanna Coke Corpn.
Plant

Buffalo, N. Y.
Coke and Coal By-Products.

Fretz-Moon Tube Co.
Plant

Butler, Pa.
Pipe.

Republic Supply Co.
Houston, Texas
Distributors of Oil Well Supplies.
Plants

Youngstown, Ohio
Pipe, Semi-finished Steel and Bars.

Warren, Ohio
Hot and Cold Rolled Strip Steel, Tin Plate, Electrical Sheets.

Niles, Ohio
Sheets.

Canton, Ohio
Alloy and Carbon Bars, Sheets.

Massillon, Ohio
Alloys, Stainless Steel and Full Finished Sheets.

Cleveland, Ohio
Bolts and Nuts.

Buffalo, N. Y.
Pig Iron, Alloy and Carbon Bars and Die Rolled Products.

Pittsburgh, Pa.
Tie Plates and Spikes.

Chicago, Ill.
Alloy and Carbon Bars, Nails and Wire.

Moline, Ill.
Rail Steel Bars.

Birmingham, Ala.
Pig Iron.

Unionville, Conn.
Bolts and Nuts.

SUBSIDIARY COMPANIES

Union Drawn Steel Company

Plants

Beaver Falls, Pa.

Massillon, Ohio

Hartford, Conn.

Gary, Ind.

Hamilton, Ontario
Cold Drawn Steel.

Ideal Foundry & Machine Co.

Plant

Beaver Falls, Pa.
Iron and Bronze Castings.

Steel and Tubes, Inc.

Plants

Cleveland, Ohio
Elyria, Ohio
Warren, Ohio
Brooklyn, N. Y.
Detroit, Mich.
Electric Welded Steel Tubing, Boiler Tubes and Conduit.

Canton Culvert Company

Plants

Canton, Ohio
Danville, Ill.
Corrugated Steel Culverts.

Berger Manufacturing Company

Plant

Canton, Ohio
Metal Furniture and other Fabricated Steel Products.

RAW MATERIALS PROPERTIES

Republic Steel Corpn. owns and operates iron ore mines in the Lake Superior district and in Alabama, and is part owner of a number of other mines.

It owns and operates coal mines in Pennsylvania and Alabama, and has a substantial interest in various limestone properties.

class of prior preference stock and increase the authorized amount of common stock;

(b) To offer to the present preferred stockholders of Republic the right to exchange each share of preferred stock now held by them for one-half share of new prior preference stock and two shares of common stock. (The purpose of this is to materially reduce the outstanding amount of preference stock of the corporation and to eliminate the existing arrears on said stock.);

(c) To create a new general mortgage of Republic which will constitute an adequate medium for financing its future requirements;

(d) To sell as a necessary part of the present transactions \$24,000,000 of convertible bonds, the proceeds of which will be used to retire the outstanding refunding and general mortgage bonds of Republic, leaving over \$16,000,000 with which to pay off bank loans, retire underlying debt and supply adequate working capital for the enlarged operations, and for other corporate purposes;

(e) To reduce the stated capital represented by the outstanding shares of common stock and in connection therewith to establish a reserve for coordinating plant facilities and to cover possible re-adjustment of plant values. This may result in a reduction of depreciation and other charges against earnings.

Advantages Cited

In explaining the advantages of the proposed changes and how they will

PLANTS AND PRODUCTS OF TRUSCON STEEL CO.

Executive Offices, Youngstown, Ohio

Plants

Youngstown, Ohio
Los Angeles, Calif.

Concrete reinforcing bars, welded wire fabric, highway guard railing, all steel products related to highway construction, metal lath products, expanded metal, cold rolled and die formed shapes, structural steel, steel poles, radio and electric transmission structures, standard steel buildings, bridge flooring, steel roofing and siding, steel windows, steel doors, steel joists, airplane hangars, filling stations, practically every steel product entering into building construction.

Pressed Steel Division—Cleveland, Ohio
Pressed Steel Products

Auto stampings, auto frames, rear axle housings, steel tunnel liner plates, steel forms, refrigerator cabinets, steel beer barrels, foundry flasks, platforms and boxes.

Truscon Laboratories—Detroit, Michigan
Waterproofings, complete line of paint products, floor hardeners and cement roofing tile.

Subsidiaries and Affiliated Companies
Oriental Steel Products Co., Ltd., Japan
Steel sash, doors, operators, lath, reinforcing, structural steel, pressed steel, Mosler safe equipment, expanded metal, reinforcing steel.

Truscon Steel Co., Ltd., Walkerville, Ontario
A general line of steel building products closely akin to those manufactured at Youngstown.

affect preferred stockholders the letter to stockholders points out that:

(1) Adoption of the plan will make it possible for the company to pay dividends any time they are earned, whereas under existing conditions the corporation must make up \$29,000,000 of losses resulting from the depression, before dividends can be paid on the present preferred stock;

(2) That the new prior preference stock will have senior rights over the present preferred stock both as to assets and earnings;

(3) The conversion features of the new prior preference stock are more favorable than on the present preferred, and

(4) The preferred stockholder receives 37 per cent of the present equity of the corporation and thus should receive a greater participation in future earnings.

With reference to the common stockholders the letter states that, while the common stockholders will relinquish part of their equity under the plan, its adoption would reduce the amount of stock outstanding, senior to the common, by approximately 50 per cent.

Also from the standpoint of the common stock approval of the plan will result in elimination of the mortgage under which the corporation would have to earn \$29,000,000 before dividends are paid, which plus the \$14,000,000 accrued dividend means that the corporation would have to earn \$43,000,000 plus dividends to accrue on the preferred stock in the meantime, before any dividend could be paid on the common stock.

Through Corrigan, McKinney, Republic will secure a major advantage in obtaining the efficient production facilities of that company, which are very advantageously located with water terminal facilities at Cleveland. The combined enterprise will own large reserves of iron ore, coal and limestone.

Truscon Steel has been for some time a large buyer of Republic's steel and upon affiliation will furnish an outlet for an even larger amount. It will increase diversification of the products of the combined enterprise. Its numerous and well-located warehouses will also facilitate the distribution of the products of Republic and Corrigan, McKinney.

Republic to Issue Securities

Republic Steel Corp'n. will issue its own securities in payment for the acquisition of Corrigan, McKinney and for the common and preferred stock of the Truscon Steel Co.

For the business, assets and good will of Corrigan, McKinney, Republic Steel Corp'n. will assume all of the former's liabilities and deliver the following securities of Republic:

Fifteen million, three hundred and sixty-one thousand dollars of 5½ per cent 20-year purchase money bonds; 27,929 shares, par value \$100, of new prior preference stock; 698,223 shares, without par value, of common stock.

Plants, Products and Properties of The Corrigan, McKinney Steel Co. and Subsidiaries

Executive Offices, Cleveland

The Corrigan, McKinney Steel Company
Plants

Cleveland, Ohio

Coke and By-Products, Pig Iron and Slag, Ingots, Billets, Blooms, Slabs, Sheet Bar and Merchant Bars, Dock and Storage facilities and 16 miles of terminal railway connecting directly with the B. & O., the W. & L. E., and the Newburgh and South Shore Railroads, and all parts of plant.

Josephine, Pa.
Pig Iron.

SUBSIDIARY COMPANIES

The Newton Steel Company
Plants

Monroe, Mich.

Newton Falls, Ohio

Hot Rolled and Hot Rolled Annealed Sheets, Hot Rolled Annealed Pickled Sheets, Cold Rolled Sheets, Porcelain Enameling Sheets, Electrical Sheets and Tin Mill Black Plates are produced at both plants.

The N. & G. Taylor Company
Plant

Cumberland, Md.

Black Plate, Cokes, Charcoals, Common Terns, Extra Coated, Rolled Tin Flashings and Tin Plate Specialties.

Raw Material Properties

The Corrigan, McKinney Steel Company owns and operates iron ore mines and has extensive ore reserves and timber holdings in the Lake Superior district. It also owns and operates coal mines with substantial reserves in the Elkhorn District of Kentucky and in Pennsylvania.

For the preferred and common stock of the Truscon Steel Co. Republic Steel Corp'n. will offer (upon completion of the other transactions described in the plan):

For each share of Truscon preferred stock ½ share of prior preference stock and two shares of common stock of Republic.

For each share of Truscon common stock four-tenths of a share of common stock of Republic.

Under these terms Republic will issue a maximum of 16,794 shares of new prior preference stock and 375,878 shares of its common stock for Truscon common and preferred stock, provided all of the latter is offered for exchange.

Corrigan, McKinney Valuation

The fixed properties of Corrigan, McKinney and its subsidiaries as of June 30, 1934, are valued at approximately \$51,000,000 after depreciation, subject to only \$3,075,000 of bonds of a subsidiary, which are a lien on its assets alone. The consolidated current assets of Corrigan, McKinney amounted to \$12,000,000 and the consolidated current liabilities to \$3,500,000; in ad-

dition to which Corrigan, McKinney had outstanding a \$2,000,000 5 per cent note due Dec. 31, 1939, which by its terms is entitled to share in any lien placed on the Corrigan, McKinney properties. To eliminate this lien arrangements have been made with the holder to accept in lieu thereof a 5 per cent secured convertible note of Republic for the same amount and same maturity.

Truscon Steel Valuation

The fixed properties of Truscon Steel and its subsidiaries are carried on its consolidated balance sheet of June 30, 1934, at \$8,600,000 after depreciation. Truscon has no funded

debt outstanding. The excess of its current assets over current liabilities at June 30, 1934, was approximately \$2,500,000.

Upon the completion of the proposed transactions, assuming (1) that all holders of present Republic preferred stock accept the offer of exchange, (2) that all shareholders of Corrigan, McKinney assent to the sale of its assets and business, and (3) that all stockholders of Truscon accept the offer of exchange for their stock, Republic will have outstanding a maximum of 342,527 shares of 6 per cent cumulative convertible prior preference stock, series A, of the par value of \$100 per share, and 4,353,120 shares of common stock without par value.

Casting Congress to Offer Instructive Program

DEVELOPMENTS and progress in the castings industry throughout the whole world will be the theme of the fifth international congress to be held in conjunction with the 38th annual convention and exposition of the American Foundrymen's Association in Philadelphia, Oct. 22 to 26.

Modern developments will be presented from three angles: advances in technical knowledge, progress in operating practice, and latest design and improvements in foundry equipment. The fact that all convention activities will be held under one roof makes possible close coordination between the different interests, and meetings have been so scheduled that plenty of time is allowed for the exposition. The program of papers, discussion, informal meetings, and exhibition of equipment will provide valuable information on many phases of foundry work.

A feature of this congress is the unusual number of papers from foreign foundry groups. Australia, Belgium, Czechoslovakia, England, France, Germany, and Italy are contributing papers dealing with modern foundry practice in those countries.

General Feature Sessions

One of the sessions which will be of interest to all foundrymen is the Materials Handling Session. Executives will find special attention given to the problems of foundry maintenance, and the selection of foundry equipment as an investment.

Refractories will be the subject of a second general interest session. Several papers of unusual practical value will be presented, among them a discussion of the relation between slags and refractory linings, a résumé of modern crucible melting equipment,

and a study of the properties of clays obtained from different sources.

The shop operation course on sand control, which has been one of the most popular and instructive features of former conventions, will be repeated this year. There will also be a session on sand control and research, where questions of analysis, supplies, and methods of control will be studied.

Cast Iron Sessions

Cast iron foundries will find an especially full program arranged for them. Two sessions, a round-table luncheon, a shop operation course on cupola practice, and a joint A.F.A.-A.S.T.M. meeting on cast iron tests and specifications, have been planned.

Among the outstanding papers are those contributed by foreign foundry associations. Germany and France send papers on high-test gray iron as made in those countries. The Italian exchange paper deals with the chemical composition of common cast iron for boilers. It is expected that the Belgian exchange paper will give data on gray iron which have been collected under the auspices of the Belgian Research Foundation, and which should be of great value.

At the joint A.F.A.-A.S.T.M. meeting on tests and specifications, papers on high-chromium cast iron, and data on fatigue tests of high strength iron, will be given.

Steel and Malleable Sessions

A general session on steel, another on the porosity of steel castings, and a round-table luncheon are planned for steel foundries. One of the most interesting papers in view is that offered by the Institute of British Foundrymen, on "Steel Castings."

Problems of solidification and contraction, and a study of controlled directional solidification, will be discussed at the general steel castings session.

The effect of copper in malleable iron, especially its influence on the annealing time, will be reported to those interested in malleable iron. The report of the committee on nomenclature, giving recommendations for names of different products made in malleable foundries, will be another feature of this session. The round-table luncheon will deal with practical problems.

Non-Ferrous Castings Sessions

A symposium on deoxidation and degasification of non-ferrous castings alloys, a general session, and a round-table luncheon are on the program for non-ferrous founders. At the symposium, there will be a discussion of general principles; then the meeting will take up bronze foundry alloys, yellow brass casting alloys, and aluminum and its alloys.

The general session on non-ferrous castings will be rich in practical information. Porosity in leaded bronze bushings and cupola melting of red brass are two of the subjects to be considered.

National Labor Board Decides on "Majority" Rule

THE National Labor Relations Board, on Aug. 23, handed down a decision in the case of Tubize-Chatillon Co. in connection with the interpretation of Section 7-a concerning majority rule.

The decision in this case, in which 1076 votes had been cast for the United Textile Workers of America and 531 votes for the employees' representation body, was that the former should represent all of the workers.

This decision is contrary to the interpretation of Section 7-a made by President Roosevelt in connection with the settlement of the threatened automobile strike. It brings one step nearer the inescapable court test of the constitutionality of NRA, for if this ruling is a forecast of labor board policy in other cases it would effectively close-shop every plant in which union labor could summon a majority of votes.

THE Bethlehem Shipbuilding Corp., Ltd., Quincy, Mass., and the Electric Boat Corp., New London, Conn., drafting departments have started work on war vessel plans for the United States Navy, recently awarded these companies, involving many millions of dollars. Building of the vessels will run well into 1935.

Business and Politics Need a Working Agreement

THE productive capacity of business is such that if it is fostered in its present and future development it can increase the production and distribution of wealth to all classes of society, to the disadvantage of none; and at the same time permit the accumulation of ample reserves for any social emergency.

"New employment and new purchasing power can be created by encouraging business enterprise in an expanding production and distribution of goods and services; and this enterprise and this expansion can be so ordered as to avoid the follies of the era of speculative inflation."

The foregoing quotations from a recent address by Ralph E. Flanders, president, Jones & Lamson Machine Co., Springfield, Vt., before the Industrial Advisory Board, of which he was formerly a member. While addressing himself particularly to the problems of ending unemployment, he made some searching observations bearing on the present entanglements of business and government, and the following epigrammatic utterances of his are here offered as a helpful contribution in the thinking of correctives to be made to the industrial system:

Social Obligation to Rank High

Our first duty is to understand the nature of the profit-supported, credit-money business organization by which we live. The term "business," which we have been using, is an honorable word. It should be confined in its application to those activities involving land, labor, capital, and management which are essentially wealth-producing, whether in the fields of extraction, manufacture, transportation, distribution, or financing.

There are other activities which are not productive but destructive, and thus do not deserve the honorable name of business. Their greatest de-

velopment has been as malignant financial and speculative growths which are for the most part engendered and nourished by individuals who cannot properly be called business men.

If business is to perform its normal, productive functions, there must be important changes in attitude and policy on the part of all elements of the social structure.

Labor must be willing to govern its requests by the overall requirements of the industrial process, and not by the immediate self interest of any restricted group.

Financial interests must refrain from building top-heavy credit and speculative structures, and must be willing to look to true business service for their profit.

Government must distinguish between business in its proper sense and destructive practices which are unworthy of the name, giving the former adequate freedom and active encouragement, while it restricts the latter.

Care must be taken to avoid the appointment of officials having discretionary power who are hostile to the profit system, and therefore in-

RALPH E. FLANDERS holds that if politics and business can come to a working agreement for the public good, progress will continue. We have an industrial organization purged for the moment, he said, of the poison of financial folly, an organization furnished with the tools, the skill and the experience for building up the material well-being of society and by no means deaf to the promptings of the social conscience.

"In the past this organization, based on the resources of our country, staffed by its capable citizens, energized by science and engineering, has built up general standards of living unknown in any other time or place. This progress need not and must not end."

capable of assisting it to attain its full social usefulness.

Available credit has been multiplied by governmental policy. But there must also be a willingness to borrow on the part of productive borrowers. Here the government's policies are seriously in question, in that they have generated a wide-spread distrust as to the permanence of our system.

Business Must Discipline Itself

Business must not be shortsighted in its distribution of the returns from an expanding industry, but must give due shares to labor, to the consumer, to management, and to capital.

Business management must be content with business profits, and not make its principal interest the search for illusory and unsocial speculative gains.

Neither private profit nor general well-being will be served in the long run by attempting unduly to safeguard business operation and profit, even for the sake of stabilizing employment. Some measure of uncertainty, some percentage of mortality, is the price of social advance.

Business must cheerfully accept proper taxation for socially desirable purposes, and be willing in other ways to submit to that minimum of government control which the general interest requires. Finally, business must develop a realistic social philosophy. Its purposes must be crystal clear, its policies humanly useful.

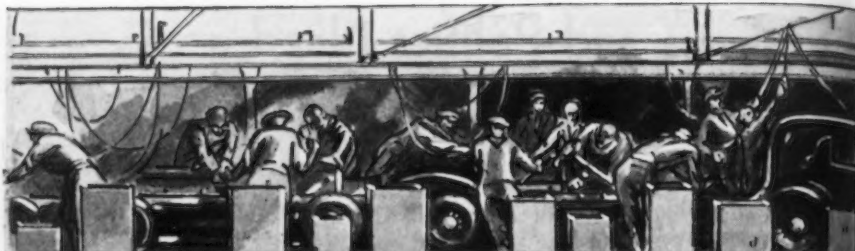
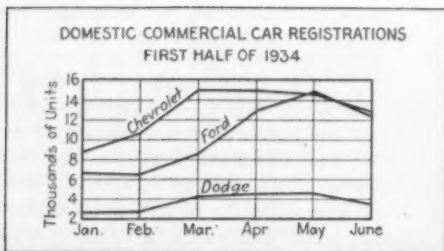
It is profit from legitimate business as already defined, that is socially desirable. The immense profits of the 1928-1929 period were not earned from business but were derived from speculative inflation. They were, indeed, not profits at all, being mere borrowings on the future, based on bank indebtedness which had to be made good later; not usually by the original borrower, and in the payment of that indebtedness purchasing power was disastrously extinguished.¹ "Profit," like "business," should be so defined that it becomes an honorable term, and a rational one as well.

The revival of the sick industries, the reemployment of the unemployed, depends on the reappearance of generous profits. Only so can those unfortunate workers who are dependent on the capital goods industries, on luxury and durable goods manufacture, and on the service occupations hope to regain a foothold in our industrial society.

For the sake of the common man,

(Continued on Page 57)

¹ No incident of the depression, says Mr. Flanders, was more significant than the total disappearance from purchasing power of nearly \$1,000,000,000 of soldiers' bonus in two or three weeks in the spring of 1931. It all went to the paying of bank indebtedness. The lesson to be drawn is twofold. It reveals the insufficiency of the "purchasing power theory," on which much of the recovery program is based. And it points to the danger of applying bank credit to capital expansion, or to long term instalment buying. Such debts must be settled under deflationary conditions, and purchasing power is extinguished in the process; as would not be the case if these activities were financed from savings.



THIS WEEK ON THE

Will Continue Current Models As Long as Possible

DETROIT, Aug. 28.

AS the end of the current model season draws near, car manufacturers are continuing to concentrate major effort on prolonging sales of 1934 cars rather than on preparations for next year's production. That no dates apparently have been set for introduction of new lines is explained by the fact that most companies expect to make present cars just as long as the public will buy them in satisfactory volume. When sales fall below the profit line, new car programs will be rushed to completion.

The fall selling season holds considerable promise in the eyes of leading makers. Money is being poured generously into advertising and sales promotion campaigns in the hope that sales will be sustained at moderate levels. The last few months have been filled with surprises for the industry, what with June surpassing May in sales and then July setting a high mark for the year. These developments have given executives the feeling that people have more money than they seem to have and that if selling campaigns are conducted intelligently they will produce good results.

Current car stocks are about normal. It is expected that in the next month production will be kept synchronized with sales so that dealers will not have too many cars on hand as new model assemblies begin. So-called "clean-up sales" should be less in number than in recent years.

There always is a certain amount of strategy in the scheduling of new models. One manufacturer wants the jump on his competitor, yet an advantage is to be gained sometimes in holding off most of the new car program until early spring when retail

buying gets under way. With the New York show no longer holding its former appeal, car makers are somewhat at a loss to know what procedure to follow in order to secure the most business. The general impression is that 1935 introductions will be strung out over a considerable period, starting in November, rather than crowded into two or three weeks, as they were a year ago.

Tool and Die Work Delayed

The bulk of tool and die work still is being held back. Local shops have been expecting to secure this business since June 1, but have met with recurring postponements until now they won't even attempt to predict when orders will be placed. Of course, before tools and dies are built, patterns must be made, and union pattern makers are on strike. Representatives of out-of-town pattern shops are understood to have been in Detroit the past week to try to get some of the pattern business, but they are reported to have met with slight success. The truth is that little pattern work is yet to be had.

Prolongation of the assembly of current models may mean another small steel buy on the part of some automobile companies, although supposedly they have completed purchases for current production runs. Initial releases of steel for 1935 cars are looked for the coming week when Fisher Body may specify certain items for the Pontiac six, first of the General Motors cars to go into production. This tonnage, however, will come in slowly and will not be large in volume. Pontiac will start assemblies late in October.

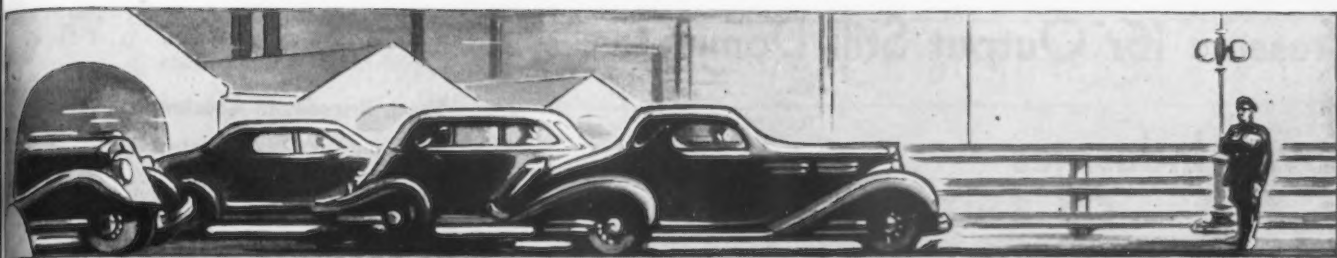
What Chevrolet will do next year is problematical. The two lines—Standard and Master series—will be retained, but there is said to be a

possibility that the two will not have the same general body design as they have had the past year. The Standard may hold closely to the present design, making a play for volume on the basis of low price. The Master line, on the other hand, is understood to be committed to a "flashy" design which will put forward snappy appearance as the chief selling feature. Chevrolet is exerting every effort to come out on top in passenger car registrations for 1934. The race in the first six months of this year was a see-saw affair, with Ford winning during January, February and May and Chevrolet in March, April and June. Because of its large lead in the month of January, Ford outdistanced Chevrolet for the six-months' period by more than 26,000 cars. Registrations in 24 States in July show Chevrolet with 34,668 cars and Ford with 34,023.

Quality Car Makers Losing Ground

Even though recovery from the depression low has been felt in the automobile industry, the trend toward low-priced cars has not stopped. The four makers in that field—Chevrolet, Ford, Plymouth and Terraplane—sold 289,919 more passenger cars in the first six months of this year than in the similar months of 1933. This was a gain of 53 per cent. All manufacturers with cars priced between this group and the quality group (Packard, Cadillac, Lincoln, Pierce-Arrow) increased their sales 21 per cent. The quality group, contrary to the general trend, registered a loss of 15 per cent.

With high-priced cars losing ground, manufacturers in that class are in a quandary. Packard is trying to solve its problem by going into the higher medium-priced field with its proposed eight, while reports long



ASSEMBLY LINE

have associated Lincoln with development of a car to sell around \$1,200 to \$1,500. Cadillac has gained some additional volume by revamping the La Salle line and naming a popular price on it. Nevertheless the local plant was closed recently for several weeks because of lack of orders. Pierce-Arrow is going through a reorganization under the new Federal bankruptcy law. The story is that an effort is being made to prevent sale of the company to a large automobile manufacturer, presumably E. L. Cord. Conversations are reported to have taken place between representatives of Mr. Cord and the managements of Reo and Pierce-Arrow looking toward a merger of Auburn, Reo and Pierce-Arrow. This was first reported in this column on Aug. 9. It is significant that Roy Faulkner, one of the chief executives of Pierce-Arrow, has returned to Auburn as president, a position which he held in the days when Auburn was at its crest.

That independent car makers are having increasing difficulty in obtaining business is indicated by analysis of passenger car registrations in the first half of the year. Ford, General Motors and Chrysler sold 1,010,706 passenger cars in the January-June period, as against 691,996 in the same period of 1933, a gain of 46 per cent. This left only 101,460 cars which were sold by the independents, or 9 per cent of the total. In the first six months of last year, independent makers sold 82,372 cars, or 10 per cent of the market.

Stainless Steel Outlook Unpromising

The outlook for stainless steel in the motor car industry the coming year is anything but promising. The reason is that economy in manufacture of parts is being stressed more than ever before, and the high price of stainless compared with competitive materials will prevent its wider use. The number of parts for which stainless will be specified probably will be as large as in 1934, but the poundage will be less. This is due to the fact that car manufacturers are changing over to lighter gages wherever possible in order to save money.

One way in which motor car companies have economized is to put a

By **BURNHAM FINNEY**
Detroit Editor, **THE IRON AGE**

thin layer of stainless over a heavier gage piece of plain carbon steel, curling the edges of the stainless over the carbon steel in a press so as to form a tight bond. One manufacturer has been making its hub caps in this manner and another company its running board molding. Stainless steel faces the possible loss of its largest single piece of business in the automobile industry—Ford lamp shells. As a matter of economy Ford is said to be considering painting its shells the color of the car in 1935. A final decision has not yet been reached. Buick is understood to be figuring on a stainless steel radiator grille for next year.

The Packard Motor Car Co. is expected to start purchasing equipment today for the manufacture of its light eight. Initial buying will be for the cylinder block and crankshaft lines. Packard is reported to have decided to build the motor in its own plant but final decision has not been reached regarding the transmission and the rear end unit. If the latter two major parts should be manufactured by Packard instead of being bought from outside suppliers, it is believed that the Packard company will have to install a substantial amount of gear cutting machinery and that its total expenditures for new equipment then would be at least \$1,000,000.

Packard originally figured on tooling up its plant to build 10 units of the light car per hour, later raising contemplated production to 20 units and more recently revising estimates back on to a basis of 10 units. It is not known what number of units its latest schedule calls for.

Reports have been circulated in Detroit to the effect that Ford is considering using its small V-eight engine, originally designed for model 44, with its present chassis and selling the car at a low price. According to this report Ford would have two distinct lines of cars next year. In well informed circles it is thought that such a move on the part of the Ford company is improbable. If this action were con-

templated it is unlikely that Ford recently would have had much of the equipment for machining the model 44 engine rebuilt for the present model 40 job. The fact seems fairly well established that the 1935 Ford will be somewhat longer than present models and that body treatment will trend toward a more radical design. However, definite information regarding Ford's plans still is tightly locked in the engineering laboratories at Dearborn. Meanwhile Ford has its competitors guessing as to what its 1935 program will be and some of the delay by Chevrolet and Plymouth in going ahead with new models can be attributed to a desire on their part to see what Ford intends to do.

Although the Rouge car manufacturing plant went down last Friday night and will not reopen until Sept. 4, the Ford steel plant is continuing to operate close to full capacity. Chevrolet has not altered its schedule for this month which will show a total output of around 75,000 to 80,000 cars with about 55,000 units scheduled for September.

The industry's production next month will depend directly on the extent to which retail sales hold up and therefore may vary sharply from week to week. For several months the Southwest was the most active district in the country from the standpoint of retail demand but lately the drought there has had a blighting effect on the cotton crop and on cattle raising, the result being that automobile sales have been hard hit. The southeastern section from the Mississippi to the Atlantic coast looms as relatively the best market for motor cars. It has had satisfactory crops and farmers have received a considerable amount of Federal money for crop curtailment. Industries in that district also are showing marked signs of recovery. The local steel trade still is convinced that volume steel tonnage will not be placed by the automobile industry until late October. August pig iron shipments to automotive foundries and to other consumers in Michigan will be double those in July. It must be remembered however that the total tonnage last month was exceptionally light because of the extensive stocking of iron in June prior to price advances.

Pressure for Output Still Dominates

Soviet Industries

THE pig iron production of the Soviet Union from Jan. 1 to May 20 of this year has shown an increase of 58 per cent against the corresponding period of last year. In May the daily rate of production was holding above the 29,000-ton mark, approaching very closely the planned rate of production for this year. In the light of this increase, which should be recognized as an unusually large one, the chances of the Soviet steel industry to fulfill its program of 10,000,000 tons of pig iron in 1934 seem to be very good. The production of the old Russian Empire will be exceeded more than twice by such an output.

Rolled Steel Relatively Backward

The steel production for the same period is 49 per cent higher than that of last year, but it compares less favorably with the planned output for this year than does the pig iron production. While pig iron has reached as high as 98 to 99 per cent of the planned output, steel runs around 95 per cent of the planned figures.

Rolled steel in turn is only at about the 90 per cent level, though it is 39 per cent in excess of 1933's output. The volume of rolled steel totals only 16,000 to 17,000 tons per day, with ingots 26,000 to 28,000 tons.

The disproportion between the rolled steel output on one side and that of pig iron and steel ingots on the other gives considerable concern to the Soviet administration. The Soviet newspaper *Izvestia* (the organ of the Central Executive Committee of the Soviet Union), in an editorial titled "Push Forward the Rolling of Steel," stresses very strongly the need to increase the production of rolled steel. In this newspaper's opinion the capacity of the existing rolling mills in the Soviet Union is amply sufficient to give an adequate output of rolled steel, but the chief cause of the low production lies in poor organization of the rolling mills and in the mishandling of the equipment. Frequently the time occupied by interruptions of work amounts to 20 per cent and more. Changing rolls often takes disproportionate time.

The quality of the product, which is not always up to standard, is another grave problem confronting the Soviet industrial management today. The Soviet newspapers give much space to the subject and, according to *Za Industrializatsiou*, this is how the poor quality of the product occurs: "The industrialist knows that if he fails to give today the planned amount

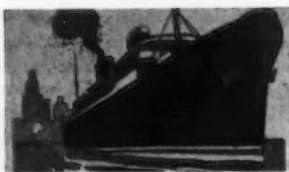
of product, tomorrow the whole country will know about this failure. But if the quality of his product suffers somewhat, only the consumer will know about that."

Quality Secondary in State Monopoly

It should be mentioned that all the more important Soviet newspapers, such as *Pravda*, *Izvestia*, *Za Industrializatsion*, give reports about the daily production of such commodities as coal, pig iron, steel, etc. In case any works lag considerably behind the planned output, the attention of the country is called to this fact, and the administration and personnel of the unlucky plant are sometimes branded in very uncomplimentary terms. It is easy to see that under these conditions the local industrial administration is anxious above all to reach production, paying little attention to the quality.

There is a basic distinction in this respect between the Soviet industrial organization and the industrial order based on private ownership. Under private ownership, poor quality affects sales adversely and, in time will decrease the profit, which is the incentive of the private institution. But the Soviet industries operate practically as monopolistic organizations, the products of which are distributed among the consumers without competition. The incentive which compels the private owner to perfect the quality of his product is absent in the Soviet industry; therefore, the Soviet Government is obliged to provide expedients to maintain quality. One of these expedients is making the producer personally responsible for quality, and placing the lapse in the class of a criminal action against the State. Such an offense is punishable by prison confinement of not less than five years.

Other means which might help to bring the quality of the Soviet product to a higher level, in the opinion of the Soviet newspapers, are the more exacting and comprehensive specifications. At present these specifications are indefinite and vague and the Soviet special court (so-called Gosarbitr) in charge of arbitrating conflicts and claims arising from un-



satisfactory quality finds it difficult to decide the cases on account of the vagueness of specifications.

Shock Brigades to Accelerate Output

Among other characteristically Soviet industrial methods, the so-called "storm work" method should be mentioned because of its importance in the Soviet system, though it is more and more considered as being rather a negative factor. Special "shock brigades" attempt to raise output of those plants which lag behind the planned figures. They often initiate the so-called "socialistic competition" with other brigades of the same or of other plants.

A few years ago enthusiasm ran high for this movement, but at present there is a considerable disillusion on its account, and it has come to be called by a rather derisive term, "stormovchina," which in the English translation would mean something between "stormism" and "storm addiction."

A result of "stormism" is uneven work in the different days of the decade (the 10-day Soviet statistical subdivision of month) and also in different decades; slack in the first days of the decade and very intensive work in the last days to attain the desired output. Thus the daily production of the rolled steel in April was as follows: first six days from 13.4 to 15.4 thousands of tons and in the last days from 18.5 to 18.9 thousands.

Republic Goes On 5-Day Week

YOUNGSTOWN, Aug. 28.—As a result of the present lull in the steel industry The Republic Steel Corp., through B. F. Fairless, executive vice-president, announced today the inauguration of a five-day week for all general and district office employees effective Sept. 1. Saturday morning work will be eliminated and the offices deserted except for the presence of a single clerk in a few of the major district offices and at Youngstown for emergency purposes only.

"We have observed that a number of large industrial concerns that went to the five-day week during the last few years have continued to operate on that basis and report general satisfaction with it," said Mr. Fairless.

"We feel that this slight reduction in hours for office employees is much to be preferred to a general reduction in the total number of employees.

"Republic solicits the cooperation of its customers in helping to make this new departure a success and gives every assurance of providing as good service in the future as in the past."

SUMMARY OF THIS WEEK'S BUSINESS

Steel Production Declines to Lowest Level of Year

Ingot Rate of 19 Per Cent Reflects Two-Point Drop—Large Orders for Naval Vessels Placed—Current Business Light

LARGE naval awards and heavy structural steel and reinforcing bar lettings have improved the long term outlook for steel, but the current situation remains discouraging. An increase in number of small orders is reported from several important producing districts but volume remains light. In most cases releases are not sufficient to sustain production at present levels and mill schedules this week and next will be at the lowest point since March, 1933.

Steel ingot production this week has declined two points to 19 per cent of capacity, the lowest rate since the bank holiday, when activity dropped under 16 per cent. This week's drop is partially attributable to the completion of orders for railroad materials, shipment of which must be made by Aug. 31 because of code regulations. With no improvement in specifications discernible, Labor Day week will likely show further curtailment.

THE 24 vessels awarded by the Navy Department will require more than 40,000 tons of steel, the rolling of which may be extended over more than a year. Private builders were given contracts to build 11 of these ships, comprising two light cruisers, two heavy and four light destroyers and three submarines. Orders for the required material will be placed in the early fall. The Navy Department will soon ask for bids on the steel for the heavy and the light cruiser, the eight light destroyers and the three submarines to be built in its own yards.

The general board of the Navy has presented its building program for 1935 which also calls for 24 ships. Included are an airplane carrier, two 8000-ton cruisers, three heavy and 12 light destroyers and six submarines. The placing of these vessels will still leave 54 ships which must be constructed to bring the Navy up to strength authorized by the London Naval Treaty, assuring a steady demand for steel from this source for at least three years.

THE week's structural awards, totaling 22,700 tons, compare with 11,400 tons last week and were above the recent average. New inquiries for fabricated steel were also heavier, amounting to 14,900 tons, as against 13,900 tons last week. Reinforcing bar lettings aggregated 18,400 tons, swelled by 12,900 tons for the Bonneville, Ore., dam, and represented one of the best weeks of the year.

The great majority of current structural steel and reinforcing bar awards continues to be for public works projects; private activity is almost entirely lacking. The PWA is preparing to speed up its plans

in order to stimulate employment during the fall and winter, but present appropriations have been largely exhausted. However, work is only beginning on many important jobs, the influence of which is still to be felt in the steel industry.

The benefits of the Federal home building and rehabilitation program will not be experienced in the steel industry before spring and then only in a mild way. Private industry is not yet beginning to avail itself of the opportunity to secure Federal funds for plant rehabilitation, loans made to date for this purpose having amounted to less than \$300,000.

THE finished steel market still lacks support from the automotive industry. Plans to continue present models as long as possible into the fall indicate that some additional steel may have to be bought. In the meantime initial purchases for 1935 models may be expected next month. Radio makers are taking tonnage more freely and stove manufacturers are boosting schedules in various districts.

The reciprocal trade agreement with Cuba, to become effective Sept. 1, promises at least a partial restoration of one of our most important export markets for iron and steel as well as some forms of machinery. Cuba's imports of United States iron and steel products in a good sugar year formerly amounted to as much as 100,000 tons, including reinforcing bars, shapes, light plates, iron and steel pipe, galvanized roofing, barbed wire and tin plate.

IMPORTANT code developments of the last week include the granting of a deduction of 60c. a ton on water and rail-and-water shipments of Southern pig iron to certain North Atlantic consuming points. This is in addition to the 38c. a ton differential already in effect. A small Detroit steel producer has petitioned the code authority of the steel industry to establish a Detroit base on hot-rolled and cold-finished steel bars and cold-rolled strip steel. The Navy Department is seeking to test the validity of the delivered price system prescribed in the code by asking for bids on a small plate tonnage with no delivery point specified.

Scrap prices have developed further weakness, with declines of 25c. a ton reported at Pittsburgh, Chicago and Philadelphia. This reduces THE IRON AGE composite price 25c. to \$9.92 a ton, the lowest level since last November. Current prices for both pig iron and steel have been reaffirmed for the fourth quarter, and THE IRON AGE composite prices are unchanged at \$17.90 a ton for iron and 2.124c. a lb. for finished steel.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italic

Pig Iron

	Aug. 28, 1934	Aug. 21, 1934	July 31, 1934	Aug. 29, 1933
<i>Per Gross Ton:</i>				
No. 2 fdy., Philadelphia.....	\$20.26	\$20.26	\$20.26	\$18.34
No. 2, Valley furnace.....	18.50	18.50	18.50	17.50
No. 2 Southern, Ch'ti.....	19.13	19.13	19.13	18.23
No. 2, Birmingham†.....	14.50	14.50	14.50	13.50
No. 2 foundry, Chicago*.....	18.50	18.50	18.50	17.50
Basic, del'd eastern Pa.....	19.76	19.76	19.76	17.84
Basic, Valley furnace.....	18.00	18.00	18.00	17.00
Valley Bessemer, del'd P'gh..	20.76	20.76	20.76	19.89
Malleable, Chicago*.....	18.50	18.50	18.50	17.50
Malleable, Valley.....	18.50	18.50	18.50	17.50
L. S. charcoal, Chicago.....	24.04	24.04	24.04	23.17
Ferromanganese, seab'd car- lots.....	85.00	85.00	85.00	82.00

†This quotation is for delivery in South; in the North prices are 38c. a ton under delivered quotations from nearest Northern furnace.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Finished Steel

	Aug. 28, 1934	Aug. 21, 1934	July 31, 1934	Aug. 29, 1933
<i>Per Lb.:</i>				
Hot-rolled annealed sheets, No. 24, Pittsburgh.....	2.40	2.40	2.40	2.25
Hot-rolled annealed sheets, Gary.....	2.50	2.50	2.50	2.35
Sheets, galv., No. 24, P'gh...	3.10	3.10	3.10	2.85
Sheets, galv., No. 24, Gary...	3.20	3.20	3.20	2.95
Hot-rolled sheets, No. 10, P'gh	1.85	1.85	1.85	1.65
Hot-rolled sheets, No. 10, Gary	1.95	1.95	1.95	1.75
Wire nails, Pittsburgh.....	2.60	2.60	2.60	2.10
Wire nails, Chicago dist. mill.	2.65	2.65	2.65	2.15
Plain wire, Pittsburgh.....	2.30	2.30	2.30	2.10
Plain wire, Chicago dist. mill.	2.35	2.35	2.35	2.15
Barbed wire, galv., P'gh....	3.00	3.00	3.00	2.60
Barbed wire, galv., Chicago dist. mill.....	3.05	3.05	3.05	2.65
Tin plate, 100 lb. box, P'gh..	\$5.25	\$5.25	\$5.25	\$4.25

Rails, Billets, etc.

<i>Per Gross Ton:</i>				
Rails, heavy, at mill.....	\$36.37 1/2	\$36.37 1/2	\$36.37 1/2	\$40.00
Light rails, Pittsburgh.....	35.00	35.00	35.00	30.00
Rerolling billets, Pittsburgh..	27.00	27.00	27.00	26.00
Sheet bars, Pittsburgh.....	28.00	28.00	28.00	26.00
Slabs, Pittsburgh.....	27.00	27.00	27.00	26.00
Forging billets, Pittsburgh...	32.00	32.00	32.00	31.00
Wire rods, Pittsburgh.....	38.00	38.00	38.00	35.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb...	1.70	1.70	1.70	1.60

Finished Steel

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....	1.80	1.80	1.80	1.60
Bars, Chicago.....	1.85	1.85	1.85	1.65
Bars, Cleveland.....	1.85	1.85	1.85	1.65
Bars, New York.....	2.13	2.13	2.13	1.95
Plates, Pittsburgh.....	1.80	1.80	1.80	1.60
Plates, Chicago.....	1.85	1.85	1.85	1.65
Plates, New York.....	2.08	2.08	2.08	1.898
Structural shapes, P'gh.....	1.80	1.80	1.80	1.60
Structural shapes, Chicago...	1.85	1.85	1.85	1.65
Structural shapes, New York.	2.05 1/4	2.05 1/4	2.05 1/4	1.86775
Cold-finished bars, P'gh.....	2.10	2.10	2.10	1.70
Hot-rolled strips, P'gh.....	1.85	1.85	1.85	1.65
Cold-rolled strips, P'gh.....	2.60	2.60	2.60	2.25

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables. ‡Blue Eagle copper.

Scrap

<i>Per Gross Ton:</i>				
Heavy melting steel, P'gh... \$11.00	\$11.25	\$11.75	\$13.75	
Heavy melting steel, Phila... 9.75	10.00	10.00	12.00	
Heavy melting steel, Ch'go... 9.00	9.25	9.50	10.25	
Carwheels, Chicago.....	9.50	9.50	10.50	
Carwheels, Philadelphia.....	11.25	11.25	12.75	
No. 1 cast, Pittsburgh.....	11.75	11.75	12.25	11.75
No. 1 cast, Philadelphia.....	11.75	11.75	11.75	12.50
No. 1 cast, Ch'go (net ton) ‡	8.00	8.00	8.50	10.50
No. 1 RR. wrot, Phila.....	11.25	11.25	11.25	12.00
No. 1 RR. wrot, Ch'go (net) .	7.25	7.25	7.25	9.00

Coke, Connellsville

<i>Per Net Ton at Oven:</i>				
Furnace coke, prompt.....	\$3.85	\$3.85	\$3.85	\$2.50
Foundry coke, prompt.....	4.60	4.60	4.60	3.25

Metals

<i>Per Lb. to Large Buyers:</i>	Cents	Cents	Cents	Cents
Electrolytic copper, refinery‡.	8.75	8.75	8.75	8.75
Lake copper, New York‡.....	9.12 1/2	9.12 1/2	9.12 1/2	9.00
Tin (Straits), New York.....	51.70	52.10	52.12 1/2	46.12 1/2
Zinc, East St. Louis.....	4.25	4.30	4.30	4.75
Zinc, New York.....	4.60	4.65	4.65	5.12
Lead, St. Louis.....	3.60	3.60	3.60	4.35
Lead, New York.....	3.75	3.75	3.75	4.50
Antimony (Asiatic), N. Y....	8.62 1/2	8.62 1/2	8.12 1/2	6.87 1/2

▲▲▲ The Iron Age Composite Prices ▲▲▲

Finished Steel

Aug. 28, 1934	2.124c. a Lb.
One week ago	2.124c.
One month ago	2.124c.
One year ago	1.959c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products make 85 per cent of the United States output.

	HIGH	LOW
1934	2.199c., April 24;	2.008c., Jan. 2
1933	2.015c., Oct. 3;	1.867c., April 18
1932	1.977c., Oct. 4;	1.926c., Feb. 2
1931	2.037c., Jan. 13;	1.945c., Dec. 29
1930	2.273c., Jan. 7;	2.018c., Dec. 9
1929	2.317c., April 2;	2.273c., Oct. 29
1928	2.286c., Dec. 11;	2.217c., July 17
1927	2.402c., Jan. 4;	2.212c., Nov. 1

Pig Iron

\$17.90 a Gross Ton
17.90
17.90
16.71

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

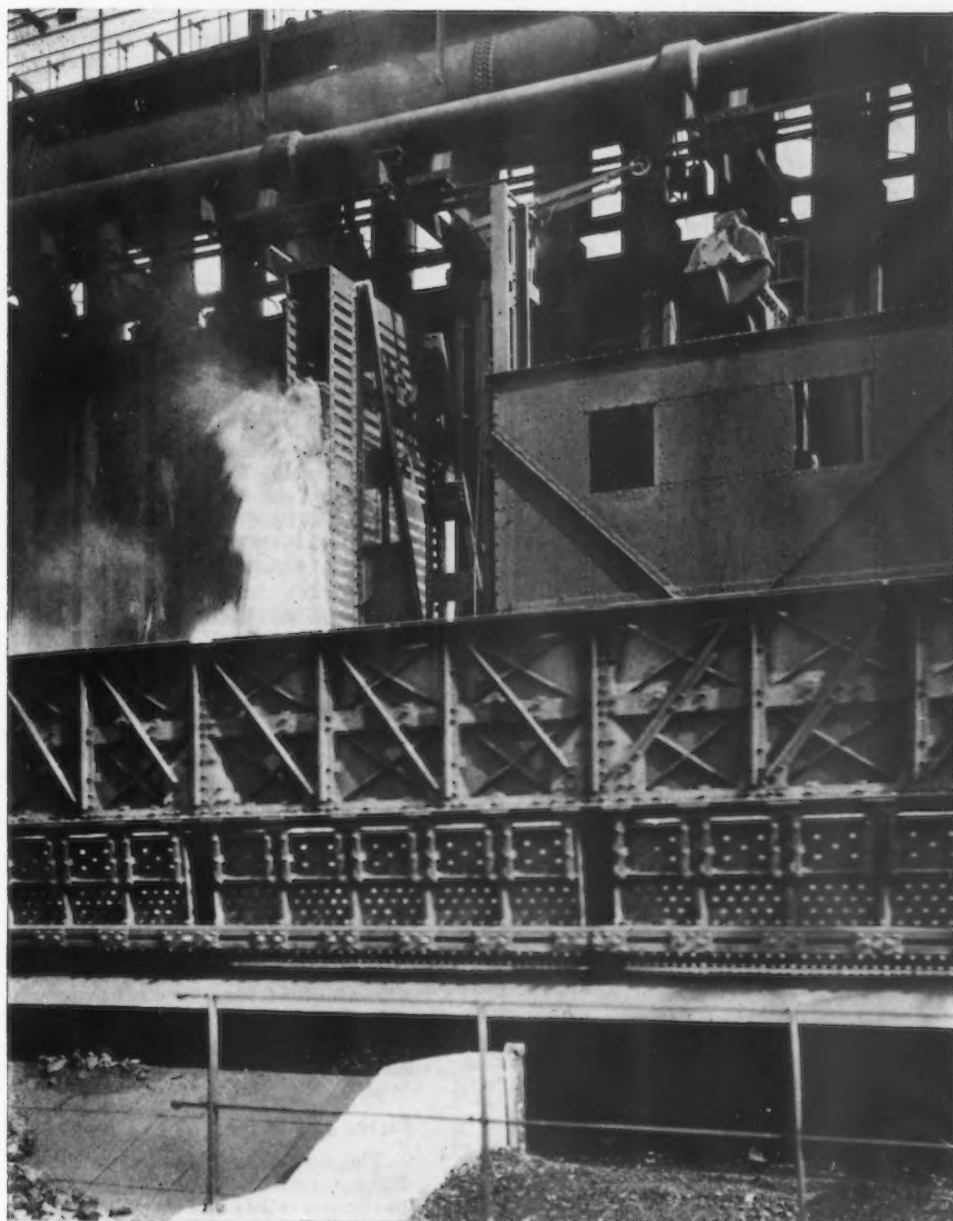
	HIGH	LOW
1934	\$17.90, May 1;	\$16.90, Jan. 27
1933	16.90, Dec. 5;	13.56, Jan. 3
1932	14.81, Jan. 5;	13.56, Dec. 6
1931	15.90, Jan. 6;	14.79, Dec. 15
1930	18.21, Jan. 7;	15.90, Dec. 16
1929	18.71, May 14;	18.21, Dec. 17
1928	18.59, Nov. 27;	17.04, July 24
1927	19.71, Jan. 4;	17.54, Nov. 1

Steel Scrap

\$9.92 a Gross Ton
10.17
10.42
12.00

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	HIGH	LOW
1934	\$13.00, Mar. 13;	\$9.92, Aug. 28
1933	12.25, Aug. 8;	6.75, Jan. 3
1932	8.50, Jan. 12;	6.42, July 5
1931	11.33, Jan. 6;	8.50, Dec. 29
1930	15.00, Feb. 18;	11.25, Dec. 9
1929	17.58, Jan. 29;	14.08, Dec. 3
1928	16.50, Dec. 31;	13.08, July 2
1927	15.25, Jan. 11;	13.08, Nov. 22



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Pittsburgh, Pa.

BECKER OVENS

Pittsburgh Steel Output Again Hits 10 Per Cent



**Low Point of Early July Is Reached With
Valley Rate Off Sharply—Improvement
Hoped for After Labor Day**

PITTSBURGH, Aug. 28.—The local steel industry is approaching Labor Day with traditional hope for a fall improvement in business. The pronounced lull that set in early in the quarter is expected to be overcome at least partly by replenishment buying, which is considered long overdue. Evidence upon which to base predictions of a general restocking movement, however, is lacking, and expectations are predicated merely upon the belief that sharp inroads into consumers' stocks have doubtlessly been made in the past two months of extremely light buying.

Producers are not reflecting the traditional optimism of the holiday in operating schedules this week, and production is more nearly attuned to the exceedingly small consumer demand. In the Pittsburgh district ingot output is off one point to 10 per cent of capacity, equaling the previous low record for this year in the first week of July. The record low weekly output was reached in July, 1932. In the Valleys and nearby northern Ohio mills operations are off sharply to 12 per cent, while in the Wheeling district output is surprisingly steady at 24 per cent.

Finishing mill schedules offer further reflections of the depressed volume of steel orders. Sheet mills are barely maintaining an average rate of 17 per cent, while strip mills are slightly under 20 per cent.

Releases of sheets and strip from the automotive industry have not expanded, nor have spot orders increased from miscellaneous sources. Merchant bar mills, though scoring a better record in August than in July, find backlogs practically exhausted at the close of August, with little new tonnage in sight. A seamless tube mill in this district has resumed after a two-week shutdown, but pipe mills as a whole are only moderately engaged, while wire mills are averaging not better than 20 per cent.

The local rail mill last week completed its rail orders, and this week will roll a limited quantity of sheet bars. Reinforcing bar mills in this district are fairly busy, with some units engaged chiefly on stock orders. Structural mills are perhaps the

busiest, but chiefly on backlog tonnage. The largest plate mill in the district is perhaps the sustaining factor in operations of the leading interests. Tin plate operations have dropped 10 points to 40 per cent.

As previously reported, no revisions in base prices for fourth quarter will become effective on Sept. 1, when current prices will be reestablished for the coming period.

Pig Iron

Producers have reaffirmed third quarter prices for fourth quarter delivery, to be quotable on Sept. 1. Basic iron will be quotable at \$18, and Bessemer at \$19, Valley furnace and Neville Island, Pa. No. 2 foundry iron will be continued at \$18.50. The lull in this market is more pronounced with the approach of Labor Day, but a seasonal pick-up in foundry trade is expected to appear next month. It is considered questionable whether any important buying of steel making iron will occur during the remainder of the current quarter.

Semi-Finished Steel

Prices filed thus far indicate no early change in prices to apply to fourth quarter shipments. Billets, blooms and slabs are being reaffirmed at \$27, and sheet bars at \$28, Pittsburgh or Youngstown. Skelp will be reestablished at 1.70c., Pittsburgh or Youngstown. Although shipments of sheet bars to non-integrated tin plate mills have begun to slacken, the volume of such business is far ahead of that in other grades. Skelp is moving steadily, while practically all other grades, excepting wire rods, are comparatively neglected.

Bolts, Nuts and Rivets

A substantial tonnage for these products will likely develop when construction of 24 Navy vessels, contracts for which have just been let, is begun. The Government will probably request bids direct on the vessels to be constructed in Navy yards. Specifications from the successful private bidders have not thus far been issued. August deliveries on contracts have not equaled those in July. Announcement of fourth quarter prices, which at present are not expected to

reflect change from the current schedules, will be made within a week.

Rails and Track Accessories

The price for standard rails will be reaffirmed for fourth quarter; likewise quotations on angle bars, track spikes, tie plates and track bolts. Market activity is limited to miscellaneous spot demands.

Bars

Soft steel bars will be reaffirmed at 1.80c., Pittsburgh, for delivery in fourth quarter. Demand in the past week has reflected little change, with August volume still considerably ahead of July business.

Reinforcing Bars

Fresh specifications are increasing, with individually important tonnage lacking. The speeding up of public works allotments is expected to stimulate an early demand for reinforcing steel. A fairly large number of grants and loans for private construction was announced this week, and rehabilitating of private and industrial structures provides a bright outlook. Practically all producers have filed for fourth quarter a price of 2.05c., Pittsburgh, for billet steel reinforcing in straight lengths for quoting by distributors. Rail steel for merchant trade will be reaffirmed at 1.70c.

Cold-Finished Steel Bars

Cold-finished bars and ground shafting will be quotable for fourth quarter at 2.10c. a lb., Pittsburgh. Alloy cold-finished bars will be reaffirmed at 2.95c. Producers are resigned to a dull market until automotive demand appears. Parts makers have not thus far manifested any interest.

Plates and Shapes

The awarding of contracts for 24 Navy vessels, of which 13 ships will be constructed at Navy shipyards and 11 ships at private yards, will eventually develop orders for about 40,000 tons of plates and shapes. The lion's share will be for hull plates, part of which will probably be rolled in this district. These lettings, however, will not be translated into orders immediately, since construction and delivery of the vessels will extend over a period of nearly two years. The Standard Oil Co. of California is expected soon to place contracts for storage tanks, requiring about 5000 tons of plates. In all other directions the plate and shape markets are featureless.

The Pittsburgh base price of 1.80c. for plates and shapes will be reaffirmed on Sept. 1 for fourth quarter business. Floor plates will likewise be reestablished at 3.35c.

Wire Products

Wire mill schedules are generally at a low point. Manufacturers' wire is showing some signs of life, while demand for wire fencing and other

agricultural needs is fair from the South and Southeast and parts of the Southwest. Wire nails are in very light demand. All producers will probably reestablish third quarter prices for delivery through fourth quarter. Difficulties growing out of price competition in the resale field are expected to be over come soon. Jobbers are naturally desirous of placing dealers in position to compete with the lower prices on wire nails named by mail order houses, and some provision under the code is expected to adjust present complications.

Tubular Products

Important producers will extend present discount cards for application to fourth quarter delivery. Mechanical tubing and standard pipe are very quiet. Although interest in oil country goods is rather damp, reappearance of important demand in this classification is expected in September, when heavy stocks accumulated in second quarter are expected to be generally depleted. The outlook for standard pipe is enhanced only by the Federal home rehabilitation plan, which has not yet reached a specific stage. The line pipe market is fairly bare of any lively important projects.

Sheets

All grades of sheets will be reaffirmed at present prices for fourth quarter delivery. New sheet business in the past week was too slim to aid backlogs, which are now generally at the lowest level this year. Operations in the current week are practically unchanged from the 17 per cent average of a week ago.

Tin Plate

Based on rolling against actual orders, the tin plate industry this week is operating at about 40 per cent, against 50 per cent last week. Some small independent mills are operating at a relatively high rate, but are engaged largely on stock orders. A few surprise orders from canners for seasonal pack have tended to offset a more precipitate decline this week, but most producers fully expect a further drop as the seasonal lull sets in during the next two months. An encouraging feature is the favorable report from salmon districts, where pack is expected to be above normal this year. Exports of canned salmon, moreover, are expected to increase in consequence of the dollar position in international exchange. Important producers have filed present prices on tin plate and tin mill black plate, for application to fourth quarter business.

Strip Steel

Most producers have reaffirmed hot-rolled strips at 1.85c. and cold-rolled strips at 2.60c., base per lb.,

Pittsburgh, for fourth quarter delivery. This market is being kept alive only by fill-in orders from automotive centers. Miscellaneous tonnage is negligible, while demand from agricultural implement manufacturers is seasonally depressed. Mill schedules are consequently erratic, with the strip industry producing at around 20 per cent of capacity.

Coal and Coke

Domestic coke prices are slightly firmer by virtue of a perceptible improvement in demand. All other grades of fuel are very dull.

Scrap

Consumers are practically out of the market for open-hearth grades. There is consequently a growing disposition on the part of dealers to offer scrap at lower prices. Quotations on moderate lots at as low as \$11, delivered, reflect the weaker tendencies of No. 1 heavy melting steel, which is now quotable at \$10.75 to \$11.25. It is considered questionable whether the lower price, which represents the dealers' buying price, would bring out much scrap from small yards, but it is similarly doubtful that any mill would purchase more than a moderate lot of scrap with ingot operations at a low point for the year. Several other sympathetic price adjustments have been made in line with the drop in heavy melting steel.

Southern Pig Iron Prices Reaffirmed

BIRMINGHAM, Aug. 28.—Business continues to drag, with practically no interest shown in current or fourth quarter requirements. New bookings are coming in irregularly and are generally for small amounts.

Pig iron producers have reaffirmed the current price of \$14.50 for the next quarter and books will be opened Sept. 1. No announcement has been made locally as to steel prices for the fourth quarter, but it is understood they will not be substantially changed, if at all.

Only five blast furnaces are now operating and only six open-hearths. No changes occurred last week and this will likely be the schedule during the current week.

Finishing mill operations have been very restricted of late, but are gradually improving. Last week at Fairfield most of the activity was provided by the sheet and plate mills. This week there will be some other units at work. Gulf States Steel last week resumed production at the blooming, plate and sheet mills. This week the rod and wire mills are also in operation.

Pig Iron Buying Up Slightly at Buffalo

BUFFALO, Aug. 28.—With some of the iron contracted for and delivered during June melted and shipped in the form of castings, pig iron buying is showing slight improvement. No large tonnages have come out, but sufficient business has turned up to cause producers to believe that a fall buying movement is about to develop. The Hanna Furnace Corp. has placed one of its furnaces, heretofore on merchant production, on silvery.

Steel output continues at a low point. The Lackawanna plant of the Bethlehem Steel Corp. is operating three open-hearths; Republic Steel Corp., two or three, and Wickwire-Spencer, one. The Seneca sheet division of Bethlehem is running at only 15 per cent of capacity.

Two or three hundred tons of highway bridge construction, covering the erection of seven bridges, will shortly come up for bids. Bids will go in next week on a 200-ton highway bridge job at Arcade, N. Y. No action apparently has been yet taken on the 700-ton grade crossing job for the Pennsylvania Railroad at Elmira.

The market for scrap is almost lifeless. The only activity has been an occasional sale of a small tonnage of machinery cast scrap at around \$11.

TRADE NOTES

HAUCK MFG. CO., Brooklyn, N. Y., announces the purchase of the assets and good will of the oil burner division of the Mead-Morrison Manufacturing Co.

The company will continue the manufacture of and stock of spare parts for the portable Handi-Forges for rivet heating and portable torches for general heating.

AMERICAN OXYGEN SERVICE CORPN. of New Jersey has acquired the assets of the Superior Oxygen Co. of Newark, N. J.

SILVER WELDING SERVICE, West Roxbury, Mass., has been appointed distributor in the Boston district for the Universal arc welders, electrodes and supplies made by the Universal Power Corp., Cleveland.

FERRO ENAMEL CORPN., Cleveland, has formed an export division for marketing Ferro Enamel supplies and equipment in foreign countries not reached by its subsidiaries in Canada, England, France and Holland. This division will handle the corporation's products in South America, Africa, Australasia, Asia, Mexico and Central America. The offices of the division will be located in Ottawa, Ontario, and the operations will be in charge of C. D. Clawson of the Ferro Enamel Corp., Cleveland, and W. Mavor, managing director Ferro Enameling Co., Ltd., Ottawa, Ont., Canada.

Steel Production Is Lower In Chicago Area



Last Week's Gain Fails to Hold As Specifications Lag—Structural Steel Awards Heavier—Scrap Declines

CHICAGO, Aug. 28.—Ingot output has dropped two points to 28 per cent of capacity and current specifications do not indicate that mills will be able to regain any of the lost ground. New buying of finished steel is still spotty but the aggregate volume is slightly better as the result of larger structural awards. Sizable additions to the Gary plant of the Illinois Steel Co. and a small bridge for the Pere Marquette represent the private enterprise side of the market.

The prime interest of buyers and sellers alike is centered on the prospects for business after Labor Day. In general sentiment has swung sharply to the belief that the fall pick-up will be moderate and that the next real turn for the better will not appear until spring.

HOLC loans are not counted on to aid the iron and steel industries and Chicago producers will have to reach far to share in much of the PWA work that is to be released this fall. A bright spot appears in road programs that for one reason or another have lagged all summer but now appear to be taking on new life.

All iron and steel prices have been reaffirmed for delivery in the fourth quarter. Steel mills have again broken through heavy melting steel prices which are down 25c. and still appear to be weak.

Pig Iron

August shipments are definitely under the July volume, most of the drop in acceptances having come in the last two weeks. Prices have been reaffirmed for fourth quarter but this action has not stimulated buying which continues on a car-lot basis. Sellers are counting on an increase in melt by the middle of September.

Sheets

Although sheet making departments have been doing better than other steel finishing units, such business as is reaching producers does not indicate a healthy market. Orders are spotty and irregular. There is every indication that stocks accumulated by users late in the second quarter have not been disappearing as fast as had been hoped for, and unless consumption speeds up soon a carry-over to

the fourth quarter may seriously affect sales in the closing months of the year. All prices have been reaffirmed for the fourth quarter.

Wire Products

Western jobbers are non-committal as to a revival of business in the early fall while jobbers in the East and South, where drought conditions have not prevailed, feel assured that better sales are at hand. Insofar as mills are concerned, the sales pulse is beating no faster, and accordingly output is being held in close conformity with shipments. Producers stocks, though well balanced, are being held unusually low for this time of year. Prices not having been a strong incentive, users did not stock heavily at the end of the second quarter and tonnages in their hands are negligible. All present quotations are reaffirmed for delivery in the fourth quarter. Mills still maintain a watchful, waiting attitude in the nail price controversy which is raging between some jobbers and mail order houses.

Rail and Track Supplies

New orders for track fastenings total over 500 tons, which is a marked improvement when contrasted with the average during most of the summer. Releases against old contracts are about 2000 tons. There is some discussion of Government loans for fall rail buying but mills are rather skeptical inasmuch as they know that many rails taken on last year's contracts are still piled in railroad yards.

Bars

Demand is uniform in spite of further slackening in use by automobile manufacturers. Inasmuch as car shops and agricultural implement builders are taking no larger quantities, it rests with miscellaneous small industries to take up the slack which they are successfully doing. Word comes to Chicago that automobile plants are now engaged principally in rounding out old schedules and are devoting more thought to new models.

Plates

Mills and plate fabricators alike are at a loss to find business that is comparable with other phases of the steel market. Most of the going tonnage

results from Government work and little of that is in the immediate vicinity of Chicago. Only an occasional reference is now being made to car building programs and old orders at car shops are well worked out. Mills are furnishing very little car material. The 400 tons of bridge deck plates to be used in Baltimore have been awarded to the American Bridge Co.

Structural Material

Awards at 5500 tons include 1700 tons for additions to mill buildings at the Gary plant of the Illinois Steel Co., 2000 tons for a bridge at Hannibal, Mo., and 1250 tons for a viaduct at Omaha, Neb. Fresh inquiries total 10,000 tons, including 5000 tons for a siphon for a project in Oregon.

Reinforcing Bars

An encouraging aspect of the market is a moderate revival of private enterprise. Among private projects, all of moderate size, are a radio station, a grain elevator, an addition to a rug factory and several "tax-saving" buildings. Highway work is also more promising. Illinois is about to open bids on 52 miles. Ordinarily such a mileage would call for over 300 tons of bars, but designs are being changed and the bar tonnage per mile is to be reduced. Each day finds more post office projects laid before dealers.

Cast Iron Pipe

Orders are better and prospects in general are improved. Chicago has ordered 2240 tons, and Grand Rapids, Mich., has placed 225 tons. Another fair tonnage has been purchased by Huron, S. D. Bids have been opened at Winona, Minn., and Madison, Wis., and there are active projects at Michigan City, Crown Point, Goshen and Bedford, Ind. Chicago is taking prices on a round tonnage of special fittings. Prices are steady, but have not yet been reaffirmed for fourth quarter deliveries.

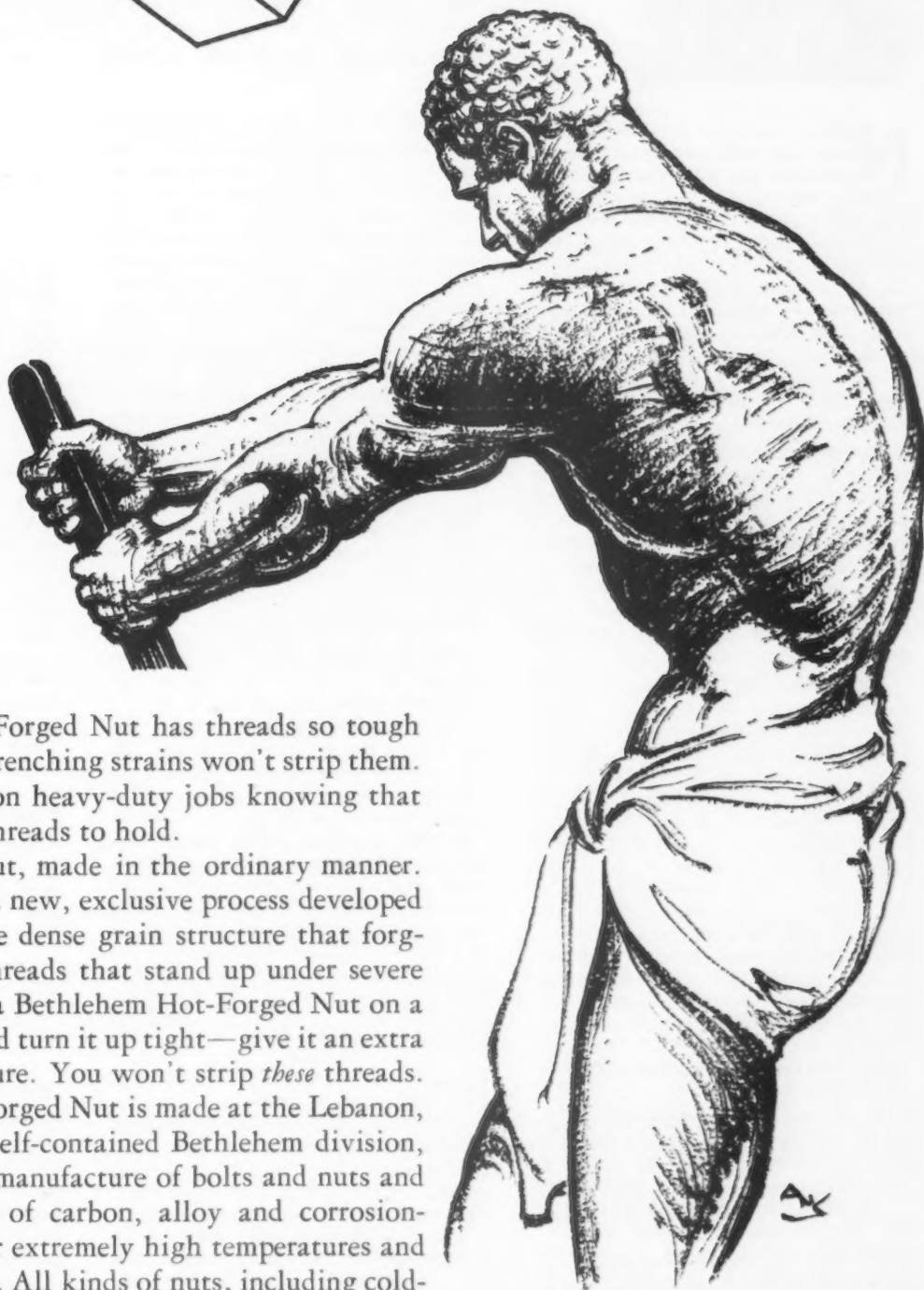
Coke

The early indication that foundry coke shipments during August would surpass July is no longer holding true, and it now looks as though the movements in the two months will be about equal. Prices are firm and in all probability current quotations will be carried through into September.

Scrap

Consumers have again had their way and steel mill grades are off 25c. a ton. Heavy melting steel is now quotable at \$8.75 to \$9.25 a ton, delivered consumers yards. The Santa Fe sold 5000 tons of scrap and obtained \$9.75 a ton, delivered, for the heavy melting grade. Financial pressure against dealers who have accumulations is a weakening factor which the market must now face.

Strong Threads



THE BETHLEHEM Hot-Forged Nut has threads so tough and strong that severe wrenching strains won't strip them. It is a nut you can use on heavy-duty jobs knowing that you can depend on the threads to hold.

It isn't an ordinary nut, made in the ordinary manner. It's a forging, made by a new, exclusive process developed by Bethlehem. It has the dense grain structure that forging gives, and strong threads that stand up under severe wrenching strains. Run a Bethlehem Hot-Forged Nut on a bolt, put on a wrench and turn it up tight—give it an extra half-turn for good measure. You won't strip *these* threads.

The Bethlehem Hot-Forged Nut is made at the Lebanon, Pa., Plant, a complete, self-contained Bethlehem division, devoted entirely to the manufacture of bolts and nuts and similar products. Bolts of carbon, alloy and corrosion-resisting steels. Bolts for extremely high temperatures and pressures. Spikes. Rivets. All kinds of nuts, including cold-punched as well as hot-forged nuts, and treated, oil-quenched and copper-bearing nuts. For your service a wide range of all standard commercial items is regularly carried in stock at Lebanon Plant, ready for immediate shipment.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

District Offices: Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Houston, Indianapolis, Milwaukee, New York, Philadelphia, Pittsburgh, St. Louis, St. Paul, Washington, Wilkes-Barre, York. Pacific Coast Distributor: Pacific Coast Steel Corporation, San Francisco, Seattle, Los Angeles, Portland, Honolulu. Export Distributor: Bethlehem Steel Export Corporation, New York.



Bethlehem Bolts and Nuts

Steel Bookings Unusually Light in New York Area



But Upturn Is Looked for in September — 150 Tons of Stainless Steel to Be Bought for Naval Vessels

NEW YORK, Aug. 28.—Steel bookings are still abnormally light, although the total for the month of August will be somewhat better than that for July. Compared with other products, tin plate remains fairly active. However, the receipt of a tin plate order merely gives the mill authority to roll, and later instructions must be awaited before shipment can be made. Some producers, it is reported, are embarrassed because their warehouses are full of unshipped material.

The present lull in the steel market is not to be accounted for solely by the excess accumulation of stocks in June; it is attributable also to a definite falling off in consumer demand as evidenced by the failure of stock to move. However, the trade is still confident that there will be a seasonal upturn of at least mild proportions next month.

Prospective railroad business includes the steel required for repairs to 1000 box and 1500 coal cars by the Lehigh Valley Railroad, which has applied for a Federal loan to carry on this work. It is understood that all of the anthracite coal carriers expect large shipments this fall and winter because of the depletion of coal stocks a year ago. The New York Central has deferred until Sept. 11 the receipt of bids on 3000 tons of structural steel for underground work between Forty-second and Fifty-third Streets, New York. The reinforcing for the approach piers for the Tri-Borough bridge, New York, amounting to 500 tons, has been awarded to E. T. Edwards.

Prices have been generally reaffirmed for the fourth quarter, but will be subject to revised extras which go into effect Oct. 1. Orders booked for shipment before Sept. 30 will take the existing extras.

Considerable steel of special quality will be required for the Navy program. For 13 vessels to be built in Navy yards, 150 tons of stainless steel will be bought.

Pig Iron

A large portion of the trade has reaffirmed third quarter prices for the remainder of the year although filing will probably not be completed

until after Labor Day. Consumers now are assured against a price rise in the fourth quarter and buying interest is consequently even less apparent than previously. About 400 tons were sold last week, as compared with 650 tons in the previous period and 800 tons booked two weeks earlier. No improvement in purchasing is expected after Sept. 1, when fourth quarter books are opened, as consumers in this territory are still too burdened with stocks to wish to commit themselves for additional supplies. The Government is asking for tenders until Friday for 200 tons of miscellaneous foundry iron for the Philadelphia Navy Yard. It is possible but not probable that some furnace may lower its price in order to secure this business.

Reinforcing Steel

Fourth quarter prices for lots over 15 tons delivered on the job in this area are 2.48c. and 2.33c. a lb. for billet and rail steel bars respectively. Awards were somewhat heavier last week, but tonnages in prospect are currently not very encouraging. The American Steel & Wire Co. will furnish 675 tons of mesh for miscellaneous highway projects in New York State, and 500 tons of bars for the Tri-Borough bridge has been awarded to E. T. Edwards. Carroll-McCreary Co., Inc., has received an export order for 300 tons, and 350 tons for a new warehouse at Grasselli, N. J., has been awarded to Truscon Steel Co.

Scrap

Although this market is almost devoid of positive factors, it is currently more interesting than various selling centers which are exclusively concerned with domestic business. There is evidently some variance in broken opinion here as to what trend the market will take in the next six months. The large purchase of railroad scrap reported last week was made at a price approximately \$1 a ton above the level at which smaller tonnages of equivalent grades could be secured elsewhere. In contradiction to this bullish position another broker sold 10,000 tons of No. 2 steel for Italian delivery last week at a price which permits only 40c. to 50c.

profit at the present market level. As delivery on this order will extend over about two months, it is evident that the seller expects no price strengthening within that period. At the present time No. 1 and No. 2 steel is being loaded in New York on barge at \$8 and \$6.50 a ton respectively for delivery to Japan, Italy and Poland. No. 1 machinery cast is also being loaded at \$7.25 a ton, barge, for Italy. A little fresh export business has been booked lately, but interest is much less encouraging than a month ago. Domestically the market continues almost inactive. Several lots of No. 2 steel were sold last week at \$8.75, delivered eastern Pennsylvania, but otherwise practically no scrap is moving from here to domestic melters.

Bridge Awards Feature St. Louis Market

ST. LOUIS, Aug. 28.—The contract for the vehicular bridge across the Mississippi River at Hannibal, Mo., was awarded as follows: the superstructure with 2600 tons of structural shapes and 200 tons of reinforcing bars, to Mount Vernon Bridge Co., and the substructure with 115 tons of reinforcing bars and 28 tons of structural steel, to the Union Bridge & Construction Co. Bids have been asked for Sept. 7 on a vehicular bridge across the Missouri River at Washington, Mo., requiring 2500 tons of structural steel and 300 tons of reinforcing bars. The St. Louis-Southwestern Railway, with headquarters here, has awarded 850 tons of structural steel for a bridge at Rob Roy, Ark., to the Virginia Bridge & Iron Co.

Demand for reinforcing bars is expected to be accelerated considerably with the maturity of numerous projects now under consideration by States in the St. Louis territory.

Current buying of strip steel consists now of bill-in lots, the volume being at about as low ebb as it has ever been.

Leading factors in the trade believe that the carry-over of stocks of pig iron into the last quarter will be small. They point out that buying during the third quarter has been exceedingly light, and that consumption has been against stocks on yards. While the August melt has been light, the decline in the stove industry's operations was not so great as had been expected.

The scrap market continues dull, mills and dealers alike marking time. Dealers' prices have been reduced as follows: No. 1 heavy melting steel, cast iron carwheels and No. 1 machinery cast, 50c. a ton; bundled sheets, 75c. a ton; machine shop turnings, \$1.50, and borings and turnings, \$1.75.

Steel Production Drops In Philadelphia Region



Output Declines Three Points to 19 Per Cent As Railroad Orders Are Cleaned Up—Large Naval Awards Made—Scrap Weaker

PHILADELPHIA, Aug. 28.—The last week of the month finds business in this territory at the lowest point of the year. In fact, the August tonnage of some eastern Pennsylvania mills will scarcely equal the worst month of the depression and is below July levels in many instances. Steel ingot production has reflected the low rate of incoming tonnage and is off three points to 19 per cent of capacity. The drop is largely occasioned by the cleaning up of rail and other railroad material orders on which shipments must be completed by Aug. 31. Output in the smaller independent plants is generally holding its own, but further curtailment may be expected next week unless orders improve sharply.

The placing of orders for 11 naval vessels with private builders and the allocation of 13 others to Navy yards was the outstanding development of the past week. A builder in the immediate Philadelphia district received a 10,000-ton light cruiser which will require about 6000 tons of plates and shapes. A heavy cruiser, which will take a slightly heavier tonnage will be built in the Philadelphia Navy Yard. During the next two months, the Navy Department is expected to ask for bids on approximately 20,000 tons of steel for the ships to be built in its own yards.

Other outstanding tonnage is entirely lacking. Smaller users of steel have not exhausted their inventories to the point which might be expected and many of them may not have to enter the market during September. Radio manufacturers are probably the most active buyers of steel at present, but their requirements are not yet especially heavy.

The raw materials markets are rather dull, although mill purchases of scrap have been somewhat more numerous. At least three mills have been in the market for No. 1 steel during the week, and prices have ranged from \$9.50 to \$10, against a recent minimum of \$10.

Pig Iron

Most of the eastern Pennsylvania furnaces have now reaffirmed current prices for fourth quarter tonnage and

will begin to solicit business for that period on Sept. 1. Consumers are showing little interest in forward buying as most of them have sufficient stock to carry them through September. The extent of buying during October will depend upon foundry operation in the fourth quarter.

Bars, Plates and Shapes

Eastern Pennsylvania plate mills expect to share heavily in the steel required for the 24 naval vessels placed last week. The ships placed with private companies will all be built in the East and Southeast while the New York, Philadelphia and Norfolk navy yards will build a light and a heavy cruiser and three destroyers. Of the 41,000 tons of steel required by the entire program, about 20,000 tons will be placed by private builders, while the Navy Department will ask for bids on the remainder in the next two or three months. That department is also taking bids Sept. 4 on 132,000 lb. of plates, with the delivery point unspecified. As the steel code enables mills to bid only on a delivered price basis, the inquiry is evidently intended to test the validity of Administrative Order X48 as applicable to the code. This order is apparently intended to enable Government departments to buy on an f.o.b. mill basis.

The structural steel and reinforcing bar markets are very quiet and even public work projects of size are lacking in this territory. Highway work constitutes the bulk of current activity. Merchant steel bars are also very dull.

Sheets and Strip

Demand for sheet steel products from radio manufacturers is improving. Orders are not yet in significant volume, but further requirements are expected to be much larger. The auto body and stamping plants in this territory are operating at a low rate and are drawing almost entirely from their stocks. Warehouse inventories are sufficient to meet September requirements in most instances, and sheet demand generally in the first half of September is not expected to

show much improvement over the low August rate. Current prices are being reaffirmed for fourth quarter.

Warehouse Business

Demand for steel out of warehouse this month has shown little change from July, both months being considerably behind the average for the first half. The prospect for September is slightly better.

Scrap

The market has developed a weaker tendency on the strength of purchases by at least three consumers of No. 1 heavy melting steel in the last week. Two consumers paid \$10, the same as the last reported figure, while another in the Philadelphia switching district procured a tonnage at \$9.75. Even more recently another user picked up two smaller lots at \$9.50, in one of which transactions no dealers were involved. In the meantime, the larger brokers are having difficulty covering old orders at \$9.50 and are paying the equivalent of this or even more for export business. No. 2 steel is also lower with small purchases at \$8 reported by two mills. Stove plate is also quotable at \$8, the leading consumer having reduced its price to this level. Heavy breakable cast is weaker with a sale as low as \$9.50 reported.

September Rise in Coast Output Expected

SAN FRANCISCO, Aug. 27.—Federal shipments of cattle from drought areas to San Francisco for slaughter give promise of increased activity on tin plate. A boost in ingot production is expected by the latter part of the coming month. Warehouse business has been showing slight gains over the second quarter.

Considerable resentment has been aroused by the failure of Western shipyards to win contracts on several warships for which they were low bidders. It is reported that bids were disqualified by bonding technicalities. However, the Navy yard at Bremerton, Wash., will build two destroyers, while one destroyer and a submarine will be constructed at Mare Island, Cal. Steel tonnages have not been announced.

Pacific Coast Engineering Co. is constructing a 1000-ton dredge pipe at Oakland, Cal., for use on the Trans-Bay bridge project. Western Pipe & Steel Co. has booked 500 tons of plates for towers and aerators for the Standard Oil Co. at Richmond, Cal. The Bureau of Reclamation has opened bids at Denver, Colo., for 750 tons of structural steel and rails for the power plant at Boulder dam. Consolidated Steel Corp. is reported as low bidder on the full schedule of material.

Steel Orders Are More Numerous at Cleveland



Tonnage Increase Not Impressive As Production Holds at 13 Per Cent of Capacity—Pig Iron More Active

CLEVELAND, Aug. 28.—New orders for finished steel have increased in number but are for very small lots. Most of them are for fill-in purposes, an order for a full car load being exceptional, and the aggregate tonnage continues very light. Steel bars and sheets are the more active items. Mills report a fair revival in the demand from miscellaneous sources for sheets, which have been almost lifeless for several weeks. The automotive industry is buying virtually nothing and little business is expected from that source for several weeks or until orders are placed for steel for new models. Pig iron is slightly more active.

Tonnage booked by some of the mills during August will show a slight gain over July, but with others will be less than during the previous month. Present prices have been reaffirmed for the fourth quarter on most steel products and pig iron by most of the producers, and those that have not already filed their prices are not expected to make any changes in their schedules. However, some changes in extras are looked for. Books for the quarter will be opened Sept. 1 and as much contracting is expected as there was for the current quarter.

Ingot output in the Cleveland-Lorain territory is unchanged this week at 13 per cent of capacity. The Lorain plant of the National Tube Co. is idle for the third week and its date of resumption has not been decided upon.

Public work involving substantial tonnages of shapes, plates and reinforcing bars was placed during the week but little new inquiry is coming from the construction field. Railroads are ordering small lots for maintenance work.

Pig Iron

The present lake furnace and Youngstown district price of \$18.50 has been reaffirmed for the fourth quarter. Demand for pig iron shows a moderate improvement as consumers are getting their stocks used up. While most orders for some time have been limited to car lots, one consumer bought 400 tons during the week and another 1500 tons. Very few third quarter contracts were written and the unspecified tonnage on these will be carried through the fourth quarter.

ter under new contracts revising the delivery dates. While the foundry melt continues low, a few foundries report a slight improvement.

Sheets

The market, which has been almost lifeless for several weeks, shows a slight improvement. Some new tonnage has come from gas stove manufacturers who are preparing to get under production on new models. Increased cost of coal under the codes is expected to cause the more general use of gas for domestic purposes in some sections and this may prove a stimulus to the gas stove industry. Shipments of sheets against its recent order are still being taken by the Cleveland plant of the Fisher Body Corp., and no new business is expected from this source for several weeks or until steel is ordered for new automobile models. Because of reduced plant operations many sheet consumers have not yet done much toward depleting stocks taken in during the second quarter.

Boston Loads 17,000

Tons of Scrap for Export

BOSTON, Aug. 28.—In addition to the cargoes of scrap for shipment to Scotland and Japan mentioned a week ago, a lot of 5000 tons of automobile parts, old rails, castings, etc., was loaded here for Poland, bringing the export movement of the past week up to approximately 17,000 tons. Arrangements have been practically completed for additional cargoes for shipment to Poland and Japan, although demand from the latter country is tapering off. During the latter part of next month about 2000 tons of No. 2 steel, etc., will be loaded at Providence, R. I., for Poland. Indications are that the export market will continue active until Nov. 1 at least.

The American Steel & Wire Co., Worcester, Mass., is in the market for additional No. 1 steel and bundled skeleton, but has shaded its offering prices. Dealers, thus far, have evinced little interest in the inquiry. Likewise offers by Pittsburgh mills for

Strip Steel

Orders are small and of a miscellaneous character. No new business is reported from the automotive industry. Some renewal of buying in that field is expected in September.

Bars, Plates and Shapes

Several jobs involving substantial tonnages were placed during the week. A Cleveland fabricator was awarded tank tops for the Eastern sewage disposal plant, Cleveland, requiring 1200 tons of plates and shapes. The plates will be rolled by a Cleveland mill. An Ohio fabricator, the Mount Vernon Bridge Co., was awarded the Hannibal, Mo., vehicular bridge over the Mississippi River, taking 2660 tons of shapes. An Ohio bridge requiring 200 tons was placed and new inquiry came from the State Highway Department for bridge work requiring 170 tons. For sewer work in Columbus, Ohio, 3000 tons of reinforcing bars were placed. New demand for merchant bars continues light.

Old Material

Activity is confined to limited purchases by dealers to cover old orders. New hold-up orders have come from the Valley district. Blast furnace scrap is bringing \$6.50 from dealers for delivery to a Cleveland consumer. There is some demand in the Youngstown district for steel making scrap for which dealers are paying \$10.50 to \$11 for No. 1 heavy melting steel, \$10 to \$10.50 for compressed sheet steel and \$10 to \$10.25 for No. 1 busheling. Local prices are unchanged and nominal.

bundled skeleton at \$4.25 a ton on cars shipping point, as against \$4.50 heretofore, have failed to result in actual business. The trade believes these feelers portend an upturn in mill activity early in September.

Business in pig iron has again simmered down to an occasional carlot, and there is little prospective business. Textile machinery manufacturers are operating at about 28 to 30 per cent of capacity, and are the most active group in New England. The melt of the foundry industry as a whole is 15 to 20 per cent of rated capacity.

The test of a flat steel-plate floor is reported at length in Research Paper RP662, of the Bureau of Standards, obtainable from the Superintendent of Public Documents, Washington, at 5 cents a copy. The test was undertaken in cooperation with the American Institute of Steel Construction, which had developed the so-called battled floor. The authors of the paper are L. B. Tuckerman, A. H. Stand and W. R. Osgood.

Prices of Finished Steel and Iron Products

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel Base per Lb.

Fab. Pittsburgh	1.80c.
Fab. Chicago	1.85c.
Fab. Gary	1.85c.
Fab. Duluth	1.95c.
Fab. Detroit	1.95c.
Fab. Cleveland	1.85c.
Fab. Buffalo	1.90c.
Fab. Philadelphia	2.09c.
Fab. New York	2.13c.
Fab. Birmingham	1.95c.
Fab. cars dock Gulf ports	2.20c.
Fab. cars dock Pacific ports	2.35c.

Rail Steel

(For merchant trade)

Fab. Pittsburgh	1.70c.
Fab. Chicago	1.75c.
Fab. Gary	1.75c.
Fab. Cleveland	1.75c.
Fab. Buffalo	1.80c.
Fab. Birmingham	1.85c.
Fab. cars dock Gulf ports	2.10c.
Fab. cars dock Pacific ports	2.25c.

Billet Steel Reinforcing

Straight lengths as quoted by distributors	
Fab. Pittsburgh	2.05c.
Fab. Chicago	2.10c.
Fab. Gary	2.10c.
Fab. Detroit	2.20c.
Fab. Cleveland	2.10c.
Fab. Youngstown	2.10c.
Fab. Buffalo	2.10c.
Fab. Birmingham	2.10c.
Fab. cars dock Gulf ports	2.45c.
Fab. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

Straight lengths as quoted by distributors	
Fab. Pittsburgh	1.90c.
Fab. Chicago	1.95c.
Fab. Gary	1.95c.
Fab. Cleveland	1.95c.
Fab. Youngstown	1.95c.
Fab. Buffalo	1.95c.
Fab. Birmingham	1.95c.
Fab. cars dock Gulf ports	2.30c.
Fab. cars dock Pacific ports	2.30c.

Iron

Fab. Chicago	1.80c.
Fab. Terre Haute, Ind.	1.75c.
Fab. Louisville, Ky.	2.10c.
Fab. Danville, Pa.	1.80c.
Fab. Berwick, Pa.	1.80c.

Cold Finished Bars and Shafting*

Base per Lb.	
Fab. Pittsburgh	2.15c.
Fab. Chicago	2.15c.
Fab. Gary	2.15c.
Fab. Cleveland	2.15c.
Fab. Buffalo	2.20c.
Fab. Detroit	2.30c.
Fab. eastern Michigan	2.35c.

*In quantities of 10,000 to 19,000 lb.

Fence and Sign Posts

Angle Line Posts

Base per Net Ton	
Fab. Pittsburgh	\$50.00
Fab. Chicago	50.00
Fab. Duluth	51.00
Fab. Cleveland	50.00
Fab. Birmingham	50.00
Fab. Houston	50.00
Fab. cars dock Pacific ports	68.00

Plates

Base per Lb.	
Fab. Pittsburgh	1.80c.
Fab. Chicago	1.85c.
Fab. Gary	1.85c.
Fab. Cleveland	1.95c.
Fab. Coatesville	1.90c.
Fab. Sparrows Point	1.90c.
Fab. Philadelphia	1.95c.
Fab. New York	2.08c.
Fab. Birmingham	1.95c.
Fab. cars dock Gulf ports	2.20c.
Fab. cars dock Pacific ports	2.35c.
Wrought iron plates, f.o.b. P'gh.	3.00c.

Floor Plates

Fab. Pittsburgh	3.35c.
Fab. Chicago	3.40c.
Fab. Coatesville	3.45c.
Fab. cars dock Gulf ports	3.75c.
Fab. cars dock Pacific ports	3.90c.

Structural Shapes

Base per Lb.	
Fab. Pittsburgh	1.80c.
Fab. Chicago	1.85c.
Fab. Cleveland	1.95c.
Fab. Buffalo	1.90c.
Fab. Bethlehem	1.90c.
Fab. Philadelphia	2.005c.
Fab. New York	2.025c.
Fab. Birmingham (standard)	1.95c.
Fab. cars dock Gulf ports	2.25c.
Fab. cars dock Pacific ports	2.35c.

Steel Sheet Piling

Base per Lb.	
F.o.b. Pittsburgh	2.15c.
F.o.b. Chicago	2.25c.
F.o.b. Buffalo	2.25c.
F.o.b. cars dock Gulf ports	2.60c.
F.o.b. cars dock Pacific ports	2.60c.

SHEETS, STRIP, TIN PLATE

TERNE PLATE

Sheets

Hot Rolled	
Base per Lb.	
No. 10, f.o.b. Pittsburgh	1.85c.
No. 10, f.o.b. Gary	1.95c.
No. 10, del'd Detroit	2.05c.
No. 10, del'd Phila.	2.14c.
No. 10, f.o.b. Birmingham	2.00c.
No. 10, f.o.b. dock cars Pacific	2.40c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.40c.
No. 24, f.o.b. Gary	2.50c.
No. 24, del'd Detroit	2.60c.
No. 24, del'd Phila.	2.69c.
No. 24, f.o.b. Birmingham	2.55c.
No. 24, f.o.b. dock cars Pacific	3.05c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.50c.
No. 10 gage, f.o.b. Gary	2.60c.
No. 10 gage, del'd Detroit	2.70c.
No. 10 gage, del'd Phila.	2.79c.
No. 10 gage, f.o.b. Birmingham	2.55c.
No. 10 gage, f.o.b. dock cars Pacific	3.10c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	2.95c.
No. 20 gage, f.o.b. Gary	3.05c.
No. 20 gage, del'd Detroit	3.15c.
No. 20 gage, del'd Phila.	3.24c.
No. 20 gage, f.o.b. Birmingham	3.10c.
No. 20 gage, f.o.b. dock cars Pacific	3.50c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh	3.10c.
No. 24, f.o.b. Gary	3.20c.
No. 24, del'd Detroit	3.30c.
No. 24, f.o.b. Birmingham	3.25c.
No. 24, f.o.b. dock cars Pacific	3.70c.
No. 24, wrought iron, Pittsburgh	4.95c.

Long Ternes

No. 24, unassorted 8-lb. coating	
f.o.b. Pittsburgh	3.40c.
F.o.b. cars dock Pacific ports	4.10c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.10c.
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Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock, Pacific Coast	3.35c.

Tin Plate Base per Box

Standard cokes, f.o.b. P'gh district	\$5.25
Standard cokes, f.o.b. Gary	5.35
Standard cokes, f.o.b. cars dock	5.35
Pacific ports	5.90

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)	
8-lb. coating I.C.	\$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under 1/4 in.

Base per Lb.	
All widths up to 24 in., P'gh.	1.85c.
All widths up to 24 in., Chicago	1.95c.
All widths up to 24 in., del'd Detroit	2.05c.
All widths up to 24 in., Birmingham	2.00c.
Cooperage stock, Pittsburgh	2.10c.
Cooperage stock, Chicago	2.20c.

Cold-Rolled Strips

Base per Lb.	
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.88c.
F.o.b. Worcester	2.80c.

Fender Stock

No. 16 and heavier, Pittsburgh or Cleveland	3.15c.
F.o.b. Worcester	3.55c.
No. 17 and lighter, Pittsburgh or Cleveland	3.30c.
F.o.b. Worcester	3.70c.

Hot-Rolled Rail Steel Strips

Base per Lb.	
F.o.b. Pittsburgh	1.70c.
F.o.b. Chicago	1.75c.
F.o.b. Birmingham	1.85c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade Per Lb.

Bright wire	2.30c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland.

To Jobbing Trade

Qualified jobbers are entitled to a reduction of 20c. a 100 lb. from the base price on carload shipments to stock, and of 10c. a 100 lb. on less-carload shipments to stock.

Base per Keg

Standard wire nails	\$2.60
Smooth coated nails	2.60
Galvanized nails:	
15 gage and coarser	4.60
16 gage and finer	5.10

Base per 100 Lb.

Annealed fence wire	\$2.45
Galvanized fence wire	2.80
Polished staples	3.30
Galvanized staples	3.55
Barbed wire, galvanized	3.00
Woven wire fence, base column	63.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., and Worcester, Mass., mill prices are \$2 a ton over Pittsburgh (except for woven wire fence at Duluth which is \$3 over Pittsburgh), and Birmingham mill prices are \$3 a ton over Pittsburgh.

On manufacturers' wire prices at Pacific ports are \$9 above the Pittsburgh base. On high-carbon spring wire, prices at Pacific ports are also \$9 above Pittsburgh. On wire nails, barbed wire, staples and fence wire, prices at Houston, Galveston and Corpus Christi are \$6 a ton over Pittsburgh, while New Orleans and Pacific Coast prices are \$8 over Pittsburgh. Exception: on fence wire Pacific Coast prices are \$11 a ton above Pittsburgh.

Wire Hoops, Twisted or Welded

Off List	
F.o.b. Pittsburgh	35 and 2 1/2 off
F.o.b. Chicago	35 off

Bale Ties, Single Loop

Base per Net Ton	
F.o.b. Pittsburgh	\$63.00
F.o.b. Chicago	64.00
F.o.b. Duluth	65.00
F.o.b. Cleveland	63.00
F.o.b. Birmingham	68.00
F.o.b. cars dock Houston, Galveston, Beaumont, Orange or Corpus Christi, Tex.	72.00
F.o.b. cars dock Pacific ports	74.00

STEEL AND WROUGHT PIPE

AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Inches	Steel	Black Galv.	Inches	Wrought Iron	Black Galv.
1/2	51 1/2	29 1/2	1 1/2	91 1/2	138
3/4	53 1/2	35 1/2	2	91 1/2	141 1/2
1	58 1/2	47 1/2	2 1/2	91 1/2	15
1 1/4	62 1/2	52 1/2	3	91 1/2	20 1/2
1 3/4	64 1/2	55 1/2	3 1/2	91 1/2	25 1/2
			4	91 1/2	28
			5	91 1/2	26

Lap Weld

2	60	51	2	37	22 1/2
2 1/2	63	54	2 1/2	38	25
3	65	56	3	40	28 1/2
3 1/2	68	59	3 1/2	42	31 1/2
4	70	61	4	44	34 1/2
4 1/2	72	63	4 1/2	46	37 1/2
5	74	65	5	48	40 1/2
5 1/2	76	67	5 1/2	50	43 1/2
6	78	69	6	52	46 1/2
6 1/2	80	71	6 1/2	54	49 1/2
7	82	73	7	56	52 1/2
7 1/2	84	75	7 1/2	58	55 1/2
8	86	77	8	60	58 1/2
8 1/2	88	79	8 1/2	62	61 1/2
9	90	81	9	64	64 1/2
9 1/2	92	83	9 1/2	66	67 1/2
10	94	85	10	68	70 1/2
10 1/2	96	87	10 1/2	70	73 1/2
11	98	89	11	72	76 1/2
11 1/2	100	91	11 1/2	74	79 1/2

Butt Weld, extra strong, plain ends

1/2	48 1/2	33 1/2	1 1/2	91 1/2	138
3/4	51 1/2	38 1/2	2	91 1/2	141 1/2
1	58 1/2	47 1/2	2 1/2	91 1/2	15
1 1/4	62 1/2	52 1/2	3	91 1/2	20 1/2
1 3/4	64 1/2	55 1/2	3 1/2	91 1/2	25 1/2
			4	91 1/2	28
			5	91 1/2	26

Lap Weld, extra strong, plain ends

2	58	50	2	40	26
2 1/2	62	54	2 1/2	42	33
3	65	57 1/2	3	44	33 1/2
3 1/2	68	60 1/2	3 1/2	46	36 1/2
4	70	63 1/2	4	48	39
4 1/2	72	65 1/2	4 1/2	50	41 1/2
5	74	67 1/2	5	52	44 1/2
5 1/2	76	69 1/2	5 1/2	54	47 1/2
6	78	71 1/2	6	56	50 1/2
6 1/2	80	73 1/2	6 1/2	58	53 1/2
7	82	75 1/2	7	60	56 1/2
7 1/2	84	77 1/2	7 1/2	62	59 1/2
8	86	79 1/2	8	64	62 1/2
8 1/2	88	81 1/2	8 1/2	66	65 1/2
9	90	83 1/2	9	68	68 1/2
9 1/2	92	85 1/2	9 1/2	70	71 1/2
10	94	87 1/2	10	72	74 1/2
10 1/2	96	89 1/2	10 1/2	74	77 1/2
11	98	91 1/2	11	76	80 1/2
11 1/2	100	93 1/2	11 1/2	78	83 1/2

On standard steel pipe an extra 5% off is allowed on sales to consumers while two 5's off apply on sales to jobbers. On less-than-carload shipments prices are determined by adding 20 and 25% and the carload freight rate to the base card. On structural steel pipe the base card is reduced 2 points and two 5's off are allowed to consumers and three 5's off to jobbers.

Note—Chicago district mills have a base

two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

	Cold Drawn	Hot
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(Continued from page 49)

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine bolts	70
Carriage bolts	70
Lag bolts	70
Plow bolts, Nos. 1, 2, 3 and 7 heads	70
Hot-pressed nuts, blank or tapped, square	70
hexagons	70
C.p.c. and t. square or hex. nuts, blank or tapped	70
Semi-finished hexagon nuts	70
Semi-finished hexagon castellated nuts, S.A.E.	70
Store bolts in packages, Pittsburgh	75
Store bolts in packages, Chicago	75
Store bolts in packages, Cleveland	75
Store bolts in bulk, P'gh.	83
Store bolts in bulk, Chicago	83
Store bolts in bulk, Cleveland	83
Tire bolts	60

Large Rivets

(1/2-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	\$2.90
F.o.b. Chicago	3.00
F.o.b. Birmingham	3.05

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	75, 10 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75 and 10
Milled headless set screws, cut thread 1/4 in. and smaller	75
Upset hex. head cap screws, U.S.S.S. or S.A.E. thread, 1 in. dia. and smaller	85
Upset set screws, cut and oval point	75 and 10
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Ingots

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Uncropped.....\$40 per gross ton

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, \$49 a gross ton. Price del'd Detroit is \$52.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton. Open-hearth grade, base.....2.45c. Delivered price at Detroit is.....2.60c. S.A.E.

Series Numbers	Alloy Differential per 100 lb.
2000 (1/4% Nickel)	\$0.25
2100 (2/4% Nickel)	0.55
2300 (3/4% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum) (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.20
4100 Chromium Vanadium Spring Steel	0.95
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95
These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. The differential for cold-drawn bars is 1/2c. per lb. higher with separate extras. Blooms, billets and slabs under 4 1/4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4 1/4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extra.	

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 2.95c. base per lb.

STAINLESS STEEL No. 302

(17 to 19% Cr. 7 to 9% Ni, 0.08 to 0.20% C)
(Base Prices, f.o.b. Pittsburgh)

	Per Lb.
Bars	23c.
Plates	26c.
Sheets	33c.
Hot-rolled strip	28 1/2c.
Cold-rolled strip	27c.

Raw and Semi-Finished Steel

Carbon Steel Reolling Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Uncropped.....\$29 per gross ton

Carbon Steel Forging Ingots

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Birmingham. Uncropped.....\$31 per gross ton

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham.

	Per Gross Ton
Reolling	\$27.00
Forging quality	32.00
Delivered Detroit	
Reolling	\$30.00
Forging	35.00

	Billets Only F.o.b. Duluth
Reolling	\$29.00
Forging	34.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md. Per Gross Ton
Open-hearth or Bessemer.....\$28.00

Skep

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved	1.70c.
Universal	1.70c.
Sheared	1.70c.

Tube Rounds

	Base per Lb.
F.o.b. Pittsburgh	1.80c.
F.o.b. Cleveland	1.80c.
F.o.b. Chicago	1.85c.
F.o.b. Cleveland	1.85c.
F.o.b. Buffalo	1.90c.
F.o.b. Birmingham	1.95c.

Wire Rods

(Common soft, base)

	Per Gross Ton
F.o.b. Pittsburgh	\$38.00
F.o.b. Cleveland	38.00
F.o.b. Chicago	39.00
F.o.b. Anderson, Ind.	39.00
F.o.b. Youngstown	39.00
F.o.b. Worcester, Mass.	40.00
F.o.b. Birmingham	41.00
F.o.b. San Francisco	47.00

Pig Iron and Ferroalloys

PIG IRON

PRICES PER GROSS TON AT BASING POINTS

Basing Points	No. 2 Fdry.	Malleable	Basic	Bessemer
Everett, Mass.	\$19.50	\$20.00	\$19.00	\$20.50
Bethlehem, Pa.	19.50	20.00	19.00	20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Steelton, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	19.50	20.00	19.00	20.50
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown	18.50	18.50	18.00	19.00
Buffalo	18.50	19.00	17.50	19.50
Erle, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, Ohio	18.50	18.50	18.00	19.00
Jackson, Ohio	20.25	20.25	19.75	20.25
Detroit	18.50	18.50	18.00	19.00
Hamilton, Ohio	18.50	18.50	18.00	19.00
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	18.50	18.00	19.50
Duluth, Minn.	18.00	18.00	18.00	19.00
Birmingham	14.50	14.50	13.50	19.00
Provo, Utah	17.50	17.50	17.50	19.00

DELIVERED PRICES PER GROSS TON AT CONSUMING CENTERS

	No. 2 Fdry.	Malleable	Basic	Bessemer
Boston Switching District				
From Everett, Mass.	\$20.00	\$20.50	\$19.50	\$21.00
Brooklyn				
From East Pa. or Buffalo	21.77	22.27	21.27	22.77
Newark or Jersey City, N. J.				
From East Pa. or Buffalo	20.89	21.39	20.39	21.89
Philadelphia				
From Eastern Pa.	20.26	20.76	19.76	21.26
Cincinnati				
From Hamilton, Ohio	19.51	19.51	19.01	20.01
Canton, Ohio				
From Cleveland and Youngstown	19.76	19.76	19.26	20.26
Columbus, Ohio				
From Hamilton, Ohio	20.50	20.50	19.50	20.50
Mansfield, Ohio				
From Cleveland and Toledo	20.26	20.26	19.26	20.26
Indianapolis				
From Hamilton, Ohio	20.77	20.77	19.77	20.77
South Bend, Ind.				
From Chicago	20.55	20.55	19.55	20.55
Milwaukee				
From Chicago	19.50	19.50	18.50	19.50
St. Paul				
From Duluth	20.94	20.94	19.94	20.94
Davenport, Iowa				
From Chicago	20.26	20.26	19.26	20.26
Kansas City				
From Granite City	21.04	21.04	20.04	21.04

Delivered prices on Southern iron for shipment to Northern points are 38c. a gross ton below delivered prices from the nearest Northern basing points.

LOW PHOSPHORUS PIG IRON

Basing points:	
Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	\$23.50
Johnson City, Tenn.	19.50
Del'd Chicago	25.15

GRAY FORGE PIG IRON

Valley furnace.....\$18.25

CHARCOAL PIG IRON

Lake Superior furnace	\$21.00
Delivered Chicago	24.04
Delivered Buffalo	24.28

CANADA

Pig Iron

Per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	\$31.00
No. 2 fdy., sil. 1.75 to 2.75	29.50
Malleable	31.00

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	\$32.50
No. 2 fdy., sil. 1.75 to 2.25	31.00
Malleable	32.50
Basic	32.50

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

	Per Gross Ton
Domestic, 80% (carload)	\$35.00

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	\$36.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	\$77.50
50% (ton lots)	85.00
75% (carloads)	107.50
75% (ton lots)	125.00
14% to 16% (f.o.b.) Welland	
Ont. (in carloads) (duty paid)	31.00
14% to 16% (less carloads)	38.50

Silvery Iron

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	.....\$22.75	12%	.....\$29.35
7%	.....23.75	13%	.....30.75
8%	.....24.75	14%	.....32.25
9%	.....25.75	15%	.....33.75
10%	.....26.75	16%	.....35.25
11%	.....27.75	17%	.....36.75

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed.

Bessemer Ferrosilicon

F. & B. Jackson, Ohio, Furnace			
	Per Gross Ton		Per Gross Ton
10%	.....\$27.75	14%	.....\$33.35
11%	..... 28.75	15%	..... 34.75
12%	..... 30.25	16%	..... 36.25
13%	..... 31.75	17%	..... 37.75

Manganese 1 1/4 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 ton additional. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrosilicon, per lb. contained W. del., carloads	\$1.35 to \$1.45
Ferrosilicon, less carloads, 1.45 to 1.55	
Ferrosilicon, 4 to 5% carbon and up, 65 to 70% Cr. per lb. contained Cr. delivered, in carloads	0.00c.
Ferrosilicon, 2% carbon	16.50c. to 17.00c.
Ferrosilicon, 1% carbon	17.50c. to 18.00c.
Ferrosilicon, 0.10% carbon	19.50c. to 20.00c.
Ferrosilicon, 0.06% carbon	20.00c. to 20.50c.
Ferrosilicon, del., per lb. contained V.	\$2.70 to \$2.90
Ferrosilicon, 15 to 18% Ti, 6 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrosilicon, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with \$2 unitage	50.00
Ferrosilicon, electric, 24% f.o.b. Anniston, Ala., per gross ton with \$2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	80c.
Silico spiegel, per ton, f.o.b. furnace, car lots	\$38.00
Ton lots or less, per ton	45.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	90.00
3% carbon grade	95.00
1% carbon grade	105.00
Spot prices	\$5 a ton higher

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$10.75 to \$11.25
No. 2 heavy melting steel	9.75 to 10.25
No. 2 railroad wrought	10.75 to 11.25
Scrap rails	11.00 to 11.50
Rails 3 ft. and under	14.00 to 14.50
Compressed sheet steel	10.75 to 11.25
Hand bundled sheet steel	9.75 to 10.25
Hvy. steel axle turnings	10.25 to 10.75
Machine shop turnings	7.50 to 8.00
Short shov. turnings	7.50 to 8.00
Short mixed borings and turnings	7.00 to 7.50
Cast iron borings	7.00 to 7.50
Cast iron car wheels	11.50 to 12.00
Heavy breakable cast	10.00 to 10.50
No. 1 cast	11.50 to 12.00
Railr. knuckles and couplers	13.50 to 14.00
Rail, coil and leaf springs	13.50 to 14.00
Bolled steel wheels	13.50 to 14.00
Low phos. billet crops	14.00 to 14.50
Low phos. sheet bar crops	13.00 to 13.50
Low phos. plate scrap	13.00 to 13.50
Low phos. punchings	13.50 to 14.00
Steel car axles	14.00 to 14.50

CHICAGO

Delivered Chicago district consumers:	
Per Gross Ton	
Heavy melting steel	\$8.75 to \$9.25
Automobile hvy. melt.	8.25 to 8.75
Shoveling steel	8.75 to 9.25
Hydraulic comp. sheets	7.75 to 8.25
Drop forge flashings	6.75 to 7.25
No. 1 busheling	6.75 to 7.25
Bolled car wheels	10.00 to 10.50
Railroad tires	10.00 to 10.50
Railroad leaf springs	10.00 to 10.50
Steel turnings	8.00 to 8.50
Steel couplers and knuckles	10.00 to 10.50
Coil springs	10.50 to 11.00
Axis turnings (elec. fur.)	8.50 to 9.00
Low phos. punchings	10.00 to 10.50
Low phos. plates, 12 in. and under	10.50 to 11.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	4.75 to 5.25
Rolling rails	10.00 to 10.50
Steel rails, less than 3 ft.	10.00 to 10.50
Steel rails, less than 2 ft.	10.50 to 11.00
Angle bars, steel	10.00 to 10.50
Cast iron car wheels	9.50 to 10.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	7.75 to 8.25

PER NET TON

Iron car axles	\$12.00 to 12.50
Steel car axles	10.00 to 10.50
No. 1 railroad wrought	7.25 to 7.75
No. 2 railroad wrought	7.75 to 8.25
No. 2 busheling	3.50 to 4.00
Locomotive tires, smooth	9.00 to 9.50
Pipe and flues	5.00 to 5.50
No. 1 machinery cast	8.00 to 8.50
Clean automobile cast	8.00 to 8.50
No. 1 railroad cast	7.50 to 8.00
No. 1 agricultural cast	7.00 to 7.50
Stove plate	5.25 to 5.75
Grate bars	4.75 to 5.25
Brake shoes	6.00 to 6.50

PHILADELPHIA

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$9.50 to \$10.00
No. 2 heavy melting steel	8.00 to 8.50
No. 1 railroad wrought	\$11.00 to 11.50
Bundled sheets	9.50
Hydraulic compressed, new	10.00
Hydraulic, compressed, old	6.50 to 7.00
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	5.00 to 5.50
Cast borings	5.00 to 5.50
Heavy breakable cast	9.50 to 10.00
Stove plate (steel works)	8.00
No. 1 low phos. heavy	14.00 to 14.50
Couplers and knuckles	13.50 to 14.00
Bolled steel wheels	13.50 to 14.00
No. 1 blast furnace	5.00 to 5.50
Spec. iron and steel pipe	8.00
Shafting	15.00 to 16.00
Steel axles	14.50
No. 1 forge fire	9.50
Cast iron car wheels	11.00 to 11.50
No. 1 cast	11.00 to 12.00
Cast borings (chem.)	12.00 to 12.50
Steel rails for rolling	12.00

CINCINNATI

Dealers' buying prices per gross ton:	
Heavy melting steel	\$7.00 to \$7.50
Scrap rails for melting	8.00 to 8.50
Loose sheet clippings	3.50 to 4.00
Bundled sheets	5.50 to 6.00
Cast iron borings	4.75 to 5.25
Machine shop turnings	4.50 to 5.00
No. 1 busheling	6.00 to 6.50
No. 2 busheling	2.50 to 3.00
Rails for rolling	8.50 to 9.00
No. 1 locomotive tires	8.25 to 8.75
Short rails	11.00 to 11.50
Cast iron car wheels	7.50 to 8.00
No. 1 machinery cast	8.75 to 9.25
No. 1 railroad cast	8.25 to 8.75
Burnt cast	5.75 to 6.25
Stove plate	5.75 to 6.25
Agricultural malleable	7.75 to 8.25
Railroad malleable	7.75 to 8.25

CLEVELAND

Per gross ton delivered consumers' yards:	
No. 1 heavy melting steel	\$8.50 to \$9.00
No. 2 heavy melting steel	8.00 to 8.50
Compressed sheet steel	8.00 to 8.50
Light bundled sheet stampings	6.50 to 7.00
Drop forge flashings	7.50 to 8.00
Machine shop turnings	6.25 to 6.75
Short shoveling turnings	7.00 to 7.50
No. 1 busheling	7.50 to 8.00
Steel axle turnings	7.50 to 8.00
Low phos. billet crops	13.25 to 13.75
Cast iron borings	6.50 to 7.00
Mixed borings and short turnings	6.50 to 7.00
No. 2 busheling	6.50 to 7.00
No. 1 cast	11.50 to 11.75
Railroad grate bars	7.00 to 7.50
Store plate	6.50 to 7.00
Rails under 3 ft.	14.00 to 14.50
Rails for rolling	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Cast iron car wheels	10.75 to 11.25

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:	
No. 1 heavy melting steel	\$9.50 to \$10.50
No. 2 heavy melting scrap	8.50 to 9.00
Scrap rails	9.50 to 10.00
New hydraulic comp. sheets	8.50 to 9.00
Old hydraulic comp. sheets	7.50 to 8.00
Drop forge flashings	8.50 to 9.00
No. 1 busheling	8.50 to 9.00
Hvy. steel axle turnings	6.50 to 7.00
Machine shop turnings	4.00 to 4.50
Knuckles and couplers	11.00 to 11.50
Coil and leaf springs	11.00 to 11.50
Roller steel wheels	11.00 to 11.50
Low phos. billet crops	11.50 to 12.00
Short shov. steel turnings	5.50 to 6.00
Short mixed borings and turnings	5.50 to 6.00
Cast iron borings	5.50 to 6.00
No. 2 busheling	5.00 to 5.50
Steel car axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 machinery cast	10.50 to 11.00
No. 1 cupola cast	9.00 to 9.50
Stove plate	8.50 to 8.75
Steel rails, 3 ft. and under	12.00 to 12.50
Cast iron car wheels	10.00 to 10.50
Industrial malleable	10.00 to 10.50
Railroad malleable	10.00 to 10.50
Chemical borings	7.00 to 7.50

BOSTON

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$5.75 to \$6.25
Scrap T rails	5.75 to 6.25
No. 2 cast	5.00 to 5.25
Breakable cast	6.00 to 6.50
Machine shop turnings	1.80 to 2.05
Bundled skeleton, long	4.25 to 4.50
Drop forge flashings	4.25 to 4.50
Blast furnace	2.00 to 2.50
Shafting	11.00 to 11.25
Steel car axles	10.50 to 11.00
Cast iron borings, chemical	8.25 to 8.50
Stove plate	6.50
Per gross ton delivered consumers' yards:	
Textile cast	\$7.50 to \$9.00
No. 1 machinery cast	7.50 to 9.00
Railroad malleable	11.40 to 11.50

NEW YORK

Dealers' buying prices per gross ton:	
No. 1 heavy melting steel	\$7.00 to \$8.00
No. 2 heavy melting steel	*\$5.50 to \$6.50
Heavy breakable cast	6.50 to 7.00
No. 1 machinery cast	7.00 to 7.50
No. 2 cast	6.25 to 6.75
Stove plate	5.00 to 5.50
Steel car axles	10.75 to 11.50
No. 1 railroad wrought	7.50 to 8.00
No. 1 yard wrought, long	6.50 to 7.00
Spec. iron and steel pipe	4.50 to 5.00
Forge fire	5.50 to 6.00
Rails for rerolling	7.50 to 8.50
Short shoveling turnings	2.50 to 3.00
Machine shop turnings	3.50 to 3.75
Cast borings	2.00 to 2.50
No. 1 blast furnace	11.00 to 11.50
Unprepared yard iron and steel	3.00 to 4.00
Per gross ton, delivered local foundries:	
No. machinery cast	\$10.75
No. 1 hvy. cast (cupola size)	9.75
No. 2 cast	8.25

*For direct car loading only. †Loading on barge.

BIRMINGHAM

Per gross ton delivered consumers' yards:	
Heavy melting steel	\$10.00
Scrap steel	9.00
Short shoveling turnings	5.50
Stove plates	\$7.00 to 7.50
Steel axles	10.50 to 11.00
Iron axles	10.50 to 11.00
No. 1 railroad wrought	7.00
Rails for rolling	10.50
No. 1 cast	9.00 to 9.50
Tramcar wheels	9.00 to 9.50
Cast iron borings, chem.	8.00

ST. LOUIS

Per gross ton delivered consumers' yards:	
Selected heavy steel	\$8.75 to \$9.25
No. 1 heavy melting	8.00 to 8.50
No. 2 heavy melting	6.50 to 7.00
No. 1 locomotive tires	9.50 to 10.00
Misc. stand-sec. rails	8.75 to 9.25
Railroad springs	9.00 to 9.50
Bundled sheets	6.00 to 6.50
No. 2 railroad wrought	8.00 to 8.50
No. 1 busheling	5.00 to 5.50
Cast iron borings and shoveling turnings	3.00 to 3.50
Rails for rolling	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Heavy turnings	5.50 to 6.00
Steel car axles	10.50 to 11.00
Iron car axles	12.50 to 13.00
No. 1 railroad wrought	5.50 to 6.00
Steel rails less than 3 ft.	10.75 to 11.25
Steel angle bars	9.00 to 9.50
Cast iron car wheels	7.50 to 8.00
No. 1 machinery cast	8.50 to 9.00
Railroad malleable	8.50 to 9.00
No. 1 railroad cast	8.50 to 9.00
Stove plate	6.50 to 7.00
Agricult. malleable	8.50 to 9.00

DETROIT

Dealers' buying prices per gross ton:	
Heavy melting steel	\$6.75 to \$7.25
Borings and short turnings	4.75 to 5.25

CANADA

Dealers' buying prices per gross ton:

Toronto Montreal	
Heavy melting steel	\$5.50 \$5.50
Rails scrap	6.00 4.50
Machine shop turnings	2.50 2.50
Boiler plate	4.50 4.50
Heavy axle turnings	2.50 2.50
Cast borings	3.00 3.00
Steel borings	2.00 2.00
Wrought pipe	2.50 2.50
Steel axles	4.50 6.00
Axles wrought iron	4.50 6.50
No. 1 machinery cast	7.75 9.00
Stove plate	4.50 5.00
Standard car wheels	7.25 7.00
Malleable	6.75 7.00

ORES, FLUORSPAR, COKE, FUEL, REFRACTORIES

Lake Superior Ores

Delivered Lower Lake Ports	
Per Gross Ton	
Old range, Bessemer, 51.5% iron	\$4.80
Old range, non-Bessemer, 51.50% iron	4.65
Mesabi, Bessemer, 51.50% iron	4.65
Mesabi, non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore	
Per Unit	
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	9.50c.
Iron, low phos., Swedish, average 68% iron	9.50c.
Iron, basic or foundry, Swedish, average, 65% iron	9c.
Iron, basic or foundry, Russian, aver. 65% iron	9c.
Manganese, Caucasian, washed 52% manganese, African, Indian, 44-48%	24c.
Manganese, African, Indian, 49-51%	21c.
Manganese, Brazilian, 46 to 48%	20c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid, delivered*	\$17.50 to \$18.50
Tungsten, domestic scheelite, delivered†	17.00

Per Gross Ton

Chrome, 45%, Cr ₂ O ₃ , crude, c.i.f. Atlantic Seaboard	\$17.00
Chrome, 48% Cr ₂ O ₃ , c.i.f. Atlantic Seaboard	20.00

*Quotations nominal in absence of sales. †Nominal; no supplies available.

Fluorspar

Per Net Ton	
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines for all-rail shipment	\$15.50 to \$16.00
Same grade for Ohio River barge shipment for Kentucky and Illinois river landings	17.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	\$15.50 to 16.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	19.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2 1/2% silicon, f.o.b. Illinois and Kentucky mines	30.00

COKE, COAL AND FUEL OIL

Coke

Per Net Ton	
Furnace, f.o.b. Connellsville	\$3.85
Prompt	
Foundry, f.o.b. Connellsville	\$4.60 to 5.10
Prompt	
Foundry, by-product, Chicago ovens, for delivery outside switching district	8.50
Foundry, by-product, delivered in Chicago switching district	9.25
Foundry, by-product, New England, delivered outside switching district	11.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	9.00

Foundry, by-product, Cleveland, delivered

Foundry, Birmingham	\$9.25
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

Per Net Ton	
Mine run steam coal, f.o.b.	\$1.80 to \$2.05
W. Pa. mines	
Mine run coking coal f.o.b. W. Pa.	2.05 to 2.25
Gas coal, 1/2-in. f.o.b. Pa. mines	2.25 to 2.55
Mine run gas coal, f.o.b. Pa. mines	2.05 to 2.45
Steam slack, f.o.b. W. Pa. mines	1.55 to 1.65
Gas slack, f.o.b. W. Pa. mines	1.90 to 2.10

Fuel Oil

Per Gal. f.o.b. Bayonne, N. J.	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.
Per Gal. f.o.b. Baltimore	
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

Per Gal. del'd Chicago

No. 3 industrial fuel oil	3.85c.
No. 5 industrial fuel oil	3.38c.

Per Gal. f.o.b. Cleveland

No. 3 distillate	5.75c.
No. 4 industrial	5.50c.
No. 5 industrial	4.75c.

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works	
High-heat Intermediate Duty Brick	
Pennsylvania	\$45.00
Maryland	45.00
New Jersey	55.00
Ohio	45.00
Kentucky	45.00
Missouri	45.00
Illinois	45.00
Ground fire clay, per ton	7.00

Chrome Brick

Per Net Ton	
Standard size	\$45.00

Silica Brick

Per 1000 f.o.b. Works	
Pennsylvania	\$45.00
Chicago	54.00
Birmingham	55.00
Silica clay, per ton	8.00

Magnesite Brick

Per Net Ton	
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	\$65.00
Unburned, f.o.b. Baltimore	55.00
Imported grain magnesite, f.o.b. Baltimore and Chester, Pa.	45.00
Domestic grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

Warehouse Prices for Steel Products

PITTSBURGH	
	Base per Lb.
Plates	3.15c.
Structural shapes	3.15c.
Soft steel bars and small shapes	2.90c.
Reinforcing steel bars	2.90c.
Cold-finished and screw stock	3.45c.
Rounds and hexagons	3.45c.
Squares and flats	3.45c.
Hoops and bands under 1/4 in.	3.20c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.30c.
Galv. sheets (No. 24), 25 or more bundles	3.95c.
Hot-rolled sheets (No. 10)	2.95c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.69
Spikes, large	2.90c.
Track bolts, all sizes, per 100 count	65 per cent off list.
Machine bolts, 100 count	65 per cent off list.
Carriage bolts, 100 count	65 per cent off list.
Nuts, all styles, 100 count	65 per cent off list.
Large rivets, base per 100 lb.	\$3.50
Wire, black, soft ann'd, base per 100 lb.	\$2.70c.
Wire, galv. soft, base per 100 lb.	\$2.925c.
Common wire nails, per keg	\$2.834c.
Cement coated nails, per keg	\$2.834c.

CHICAGO	
	Base per Lb.
Plates and structural shapes	3.20c.
Soft steel bars	2.95c.
Cold-fn. steel bars and shafting	3.50c.
Rounds and hexagons	3.50c.
Flats and squares	3.50c.
Hot-rolled strip	3.30c.
Hot-rolled annealed sheets (No. 24)	3.85c.
Galv. sheets (No. 24)	4.55c.
Hot-rolled sheets (No. 10)	3.05c.
Spikes (9/16 in. and lighter)	3.50c.
Track bolts	4.65c.
Rivets, structural (keg lots)	3.50c.
Rivets, boiler (keg lots)	3.60c.
Machine bolts	60 and 5
Carriage bolts	60 and 5
Coach and lag screws	60 and 5
Hot-pressed nuts, sq. tap. or black	60 and 5
Hot-pressed nuts, hex. tap. or black	60 and 5
Hex. head and cap screws	80
Cup point set screws	70 and 10
Flat head bright wood screws	37 1/2 and 10
Spring cotter pins	50
Stove bolts in full packages	70 and 10
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.50 off list
No. 8 black ann'd wire per 100 lb.	\$3.85
Com. wire nails, base per keg	3.05c.
Cement ct'd nails, base per keg	3.05c.

NEW YORK	
	Base per Lb.
Plates, 1/4 in. and heavier	3.40c.
Structural shapes	3.37c.
Soft steel bars, small shapes	3.22c.
Iron bars	3.22c.
Iron bars, swed. charcoal	6.50 to 7.25c.
Cold-fn. shafting and screw stock	3.92c.
Rounds and hexagons	3.92c.
Flats and squares	4.42c.
Cold-roll. strip, soft and quarter hard	3.32c.
Hoops	3.52c.
Bands	3.52c.
Hot-rolled sheets (No. 10)	3.27c.
Hot-rolled ann'd sheets (No. 24)	3.85c.
Galvanized sheets (No. 24)	4.50c.
Long term sheets (No. 24)	5.20c.
Standard tool steel	11.00c.
Wire, black annealed (No. 10)	3.25c.
Wire, galv. (No. 10)	3.85c.
Tire steel, 1 x 1/4 in. and larger	3.65c.
Open hearth spring steel	4.00c. to 10.00c.
Common wire nails, base, per keg	\$3.21

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS	
	Base per Lb.
Plates and struc. shapes	3.44c.
Bars, soft steel or iron	3.19c.
Cold-fn. rounds, shafting, screw stock	3.74c.
Hot-rolled annealed sheets (No. 24)	4.09c.
Galv. sheets (No. 24)	4.79c.
Hot-rolled sheets (No. 10)	3.29c.
Black corrug. sheets (No. 24)	4.09c.
*Galv. corrug. sheets	4.79c.
Structural rivets	3.99c.
Boiler rivets	4.09c.
Tank rivets, 7/16 in. and smaller	55
Machine and carriage bolts, lag screws, fittings up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts	1000 lb. or over
200 to 999 lb.	55 and 5
100 to 199 lb.	50 and 5
Less than 100 lb.	50

*No. 26 and lighter take special prices.

PHILADELPHIA	
	Base per Lb.
*Plates, 1/4-in. and heavier	2.95c.
*Structural shapes	2.95c.
*Soft steel bars, small shapes, iron bars (except bands)	2.90c.
*Reinforc. steel bars, sq. twisted and deformed	2.955c.
Cold-finished steel bars	3.73c.
*Steel hoops	3.40c.
*Steel bands, No. 12 and 3/16 in., incl.	3.15c.
Spring steel	5.00c.
*Hot-rolled annealed sheets (No. 24)	3.55c.
*Galvanized sheets (No. 24)	4.25c.
*Hot-rolled annealed sheets (No. 10)	3.05c.
Diam. pat. floor plates, 1/4 in.	4.95c.
Swedish iron bars	6.25c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.
*Base prices subject to deduction on orders aggregating 4000 lb. or over.
†For 50 bundles or over.
‡For less than 2000 lb.

CLEVELAND	
	Base per Lb.
Plates and struc. shapes	3.31c.
Soft steel bars	2.95c.
Reinforc. steel bars	*2.10c.
Cold-finished steel bars	3.40c.
Flat-rolled steel under 1/4 in.	3.36c.
Cold-finished strip	3.00c.
Hot-rolled annealed sheets (No. 24)	3.96c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.11c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.56c.
Black ann'd wire, per 100 lb.	\$2.65
No. 9 galv. wire, per 100 lb.	3.00
Com. wire nails, base per keg	2.40

*Plus mill. size and quantity extras.
†Outside delivery 10c. less.

CINCINNATI	
	Base per Lb.
Plates and struc. shapes	3.40c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.25c.
Ball steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.45c.
Cold-finished bars	3.70c.
Hot-rolled annealed sheets (No. 24)	4.00c.
Galv. sheets (No. 24)	4.70c.
Hot-rolled sheets (No. 10)	3.20c.
Structural rivets	3.85c.
Small rivets	3.55 per cent off list
No. 9 ann'd wire, per 100 lb. (1000 lb. or over)	\$2.91
Com. wire nails, base per keg (1 to 24 kegs)	3.50
25 to 50 kegs	3.30
Larger quantities	3.10
Cement ct'd nails, base 100-lb. keg	3.50
Chain, 1-in., per 100 lb.	8.35
Seamless steel boiler tubes, 2-in.	44.96
Lap-welded steel boiler tubes, 2-in.	42.32

BUFFALO	
	Base per Lb.
Plates	3.37c.
Struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.60c.
Cold-fn. flats and sq.	3.55c.
Round and hex.	3.55c.
Cold-rolled strip steel	3.39c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Heavy hot-rolled sheets, 3/16 in., 24 to 48 in. wide	3.62c.
Galv. sheets (No. 24)	4.65c.
Hands	3.42c.
Hoops	3.42c.
Hot-rolled unannealed sheets	3.17c.
Com. wire nails, base per keg	\$3.35
Black wire, base per 100 lb.	3.45c.

BOSTON	
	Per Lb.
Beams, channels, angles, tees, zees	3.42c.
H beams and shapes	3.42c.
Plates—sheared, tank and univ. mill, 1/4 in. thick and heavier	3.45c.
Floor plates, diamond pattern	3.18c.
Bar and bar shapes (mild steel)	3.35c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.50c. to 4.50c.
Half rounds, half ovals, ovals and bevels	4.50c.
Tire steel	4.50c.
Cold-finished rounds and hexagons	3.70c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.20c.
Blue annealed sheets, No. 10 ga.	3.25c.
One pass cold-rolled sheets No. 24	3.50c.
Galvanized steel sheets, No. 24 ga.	4.60c.
Lead coated sheets, No. 24 ga.	3.65c.

Prices delivered by truck in metropolitan Boston, subject to quantity differentials.

PACIFIC COAST	
	Base per Lb.
	San Francisco Los Angeles Seattle
Plates, tank and U. M.	3.55c. 3.70c. 3.55c.
Shapes, standard	3.55c. 3.70c. 3.55c.
Soft steel bars	3.60c. 3.70c. 3.55c.
Reinforcing bars	3.50c. 3.50c. 3.50c.
Hot-rolled annealed sheets (No. 24)	4.40c. 4.45c. 4.40c.
Hot-rolled sheets (No. 10)	3.75c. 3.80c. 3.75c.
Galv. sheets (No. 24)	5.00c. 5.05c. 5.00c.
Cold finished steel Rounds and hexagons	5.95c. 5.95c. 4.75c.
Squares and hexagons	7.20c. 7.20c. 6.00c.
Flats	7.70c. 7.70c. 7.00c.
Common wire nails—base per keg less carload	\$3.40 \$3.25 \$3.35

All items subject to differentials for quantity.

Cuba Grants Concessions On American Steel

CONCESSIONS accorded the United States in the reciprocal trade agreement with Cuba, signed Aug. 24, promise at least a partial restoration of one of our most important markets in iron and steel, as well as in some forms of machinery. Exports of iron and steel to Cuba, in a good sugar year, formerly reached as high as 100,000 tons, according to the Iron and Steel Division of the Department of Commerce. Products shipped to Cuba included the following in the order of their importance: Reinforcing bars, shapes and plates (mostly light), black and galvanized iron and steel pipe, galvanized roofing sheets, barbed wire, tin

plate, rails and accessories including railroad switches, plain wire, wire nails and staples, wire netting and wire rope and cable.

In recent years Cuba has been essentially a price market, and Belgium has taken the lion's share of the business in iron and steel, particularly the heavier steel products and barbed wire.

The United States participated only to the extent that Cuban manufacturers bought special structural forms or other products where quality took precedence over price. The new trade agreement, which goes into effect Sept. 3, gives American steel manu-

facturers new advantages either through outright reductions in duties or increased preferences, or both, on a number of important items. On structural shapes the duty is reduced from 33 to 32 hundredths of a peso per 100 kilos and the margin of preference over other countries is increased from 25 to 60 per cent. On bars the duty remains unchanged, but the preference is increased from 25 to 60 per cent. On light sheets the duty is reduced from 112 1/2 hundredths pesos to 90 hundredths of a peso and the preference is raised from 25 to 40 per cent. On other sheets the duty is cut from one and one-half pesos to 1.20 pesos and the preference is lifted from 25 to 40 per cent. Similar changes have been made in the case of railroad fish plates and axles, black and galvanized pipe, plain and galvanized wire, cables, wire nails and bolts, nuts and screws.

Plant Expansion and Equipment Buying

Showa Artificial Silk Co., Ltd., Ajinomoto Building, Kyobashi, Tokyo, Japan, recently organized with capital of 5,000,000 yen (about \$1,500,000) as an interest of Showa Fertilizer Co., same address, plans new plant at Hiroshima, Japan, where large site has been purchased. Plant will consist of several units, completely electrified, equipped for initial rating of 10 tons of rayon per day. Initial buildings are scheduled to be ready for service next March. Cost about \$500,000 with machinery.

Commissariat for Heavy Industry, Soviet Government, Moscow, plans large plant for manufacture of typewriters. It will consist of number of one-story units for parts production and assembling on mass-manufacturing basis. Cost over \$1,000,000 with machinery.

City Electrical Department, Sheffield, England, plans new electric light and power plant in Neepsaid district. Cost close to \$2,000,000 with equipment. Also proposed to build new addition to present electric generating plant at Blackburn Meadows to cost approximately a like amount.

City Council, Manchester, England, plans new municipal airport at Ringway, a suburb of city, including hangars, repair and reconditioning shops, oil storage and distributing building and other field units. Cost about \$1,000,000 with equipment.

Rover Co., Ltd., Meteor Works, Coventry, England, manufacturer of automobiles, has acquired additional property and plans new additions, including shop units. Cost over \$150,000 with equipment.

To Squeeze 682 Codes Down to 250

NATIONAL RECOVERY ADMINISTRATION has announced a re-arrangement of code groupings under which all of the existing 682 codes will be placed in 22 master classifications. Ten industry divisions will be set up into which the 22 sections will be fitted for administrative purposes. The changes will assure allied lines identical treatment on common problems and will reduce administrative overhead, estimated in some quarters as totaling more than \$100,000,000 a year. Code mergers are expected to take place naturally between units of almost identical economic interest and it is estimated present total of 682 codes will be reduced to 250.

Actinic Reactions in Wile Electric Furnace

SOME months ago there was published in THE IRON AGE an article describing a new electric furnace—the Wile hollow electrode furnace. In this it was claimed that, by passing mixtures of ores and fluxes through the hollow electrodes, almost any grade of steel, alloy or plain carbon could be made. The electrodes, it will be remembered, pass horizontally into the chamber of the furnace with the arc struck between the points.

It is now reported that some unusual phenomena are manifested in operation, though not much has been heard about the commercial use of the furnace. It is claimed that steel,

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Manufacturers of
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Turned and Polished Shafting Turned and Ground Shafting

Ordnance Department To Buy Machine Tools

WASHINGTON, Aug. 28.—The PWA has allotted \$2,300,000 to the Ordnance Department for the purchase of machine tools for arsenals.

The Navy has applied for PWA funds to build five naval tankers to cost between four and five million dollars.

including stainless, can be made with a carbon content as low as 0.01 to 0.02 per cent and that, "believe it or not," actinic rays are produced in the arc which give rise to unusual reactions. If true, these reactions might be of value metallurgically; stranger things have happened.

WASHINGTON, Aug. 28.—PWA has allotted \$1,200,000 to equip Bonneville, Ore., dam with locks for sea-going vessels. Original plans called for locks permitting passage of barges.

Spelter Purchases Recede to 600 Tons As Price Drops \$1 a Ton to 4.25c.

Lead Drops Five Points Then Returns to 3.75c. as Buying
Develops—Straits Tin and Copper Continue Inactive

NEW YORK, Aug. 28.—The domestic market for electrolytic copper is unchanged with regard to price and consumer demand. It is doubtful whether much interest will appear for at least another month, and until that time the trade expects Blue Eagle metal to remain unaltered at 9c. a lb., delivered to Connecticut Valley points. Notwithstanding the dull consumer condition there has been some activity on the Commodity Exchange. The daily turnover in standard copper has aggregated about 600 to 700 tons, but prices later have showed a tendency to sink in sympathy with the less active conditions in European centers. Foreign purchases of copper still con-

tinue considerably under expectations. Consumer demand is expected to improve in the near future, but the price war between European and American producers will probably keep quotations around the present level of 7.05c. a lb., c.i.f. usual Continental base ports. During July mine production of copper in the United States increased 3000 tons, whereas secondary production decreased 5000 tons. Deliveries into domestic consumption were sufficient to reduce stocks by 16,000 tons, and total visible supplies are now estimated at 397,000 tons.

Tin

The market has been sufficiently

active abroad to maintain London prices during the week, but New York offerings have gradually declined as Sterling exchange moved against the dollar. Straits was available this morning at 51.70c. a lb., but there were no buyers despite the fact that this was the lowest price in effect for several weeks. Practically no tin has changed hands the past seven days, and importers are not very hopeful as to the outlook for September. The tin market here as well as in other world centers is almost entirely dependent on the demands from American tin plate producers. Operations are now at 40 per cent, and there is considerable possibility that no further recession will appear as long as Government canning continues. However, a 60 per cent level is probably necessary before mills will consider it advisable to reenter the market for additional tin supplies.

Lead

One large seller reduced its price \$1 a ton last week and the consumer reaction was so encouraging that the market subsequently returned to its original level. The net result of the price manipulation was the attraction of business in one direction and the injection of some life into the lead market. Current activity is mostly composed of carlot demand for September delivery although a few October bookings have been made. What position lead prices will assume in the near future is difficult to determine. Consuming demand is expected to lag for some months and stocks are discouragingly large, being equivalent to about eight months' supply. The recent price break indicated that some sellers are willing to reduce bids in order to attract competitive business, and it is possible that the entire market may sink to a lower level.

Zinc

Last Wednesday all sellers dropped their offerings \$1 a ton to 4.25c. a lb., East St. Louis, and 4.60c., New York. However the concession seemed to make buyers ever more cautious and only 600 tons of new business was booked during the week, as compared with 3780 tons in the preceding period and 1832 tons two weeks earlier. Only a small amount of regular business can be expected in the next month as spelter consuming industries are currently operating at a rate far below normal. Due to this probable light demand, it is doubtful that Prime Western will show much price strength in

The Week's Prices. Cents Per Pound for Early Delivery

	Aug. 22	Aug. 23	Aug. 24	Aug. 25	Aug. 27	Aug. 28
Electrolytic copper, N. Y.*	8.75	8.75	8.75	8.75	8.75	8.75
Lake copper, Eastern delivery*	9.12½	9.12½	9.12½	9.12½	9.12½	9.12½
Straits tin, Spot, N. Y.	52.05	51.95	51.70		51.87½	51.70
Zinc, East St. Louis	4.25	4.25	4.25	4.25	4.25	4.25
Zinc, New York	4.60	4.60	4.60	4.60	4.60	4.60
Lead, St. Louis	3.60	3.60	3.55	3.55	3.60	3.60
Lead, New York	3.75	3.75	3.70	3.70	3.75	3.75

*Blue Eagle copper. †Refinery price ¼c. higher in Connecticut Valley.

Quotations below cover wholesale lots, f.o.b. New York.

Aluminum, 98-99 per cent, 22.90c. a lb.
Aluminum, remelt, No. 12 (grade 3), 12.75c. a lb., average for week.
Nickel electrolytic cathode, 35c. a lb.; shot and ingot, remelt electro, 36c. a lb.
Antimony, 8.62½c. a lb. Quicksilver, per flask of 76 lb., \$75.
Brass ingots, 95-5-5-5, 8.75c. a lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	54.25c. to 55.25c.
Tin, bar	56.25c. to 57.25c.
Copper, Lake	10.25c. to 11.00c.
Copper, electrolytic	10.00c. to 10.50c.
Copper, castings	9.75c. to 10.75c.
*Copper sheets, hot-rolled	16.00c.
*High brass sheets	14.50c.
*Seamless brass tubes	17.00c.
*Seamless copper tubes	17.25c.
*Brass rods	13.00c.
Zinc, slabs	5.75c. to 6.75c.
Zinc sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig	4.50c. to 5.50c.
Lead, bar	5.50c. to 6.50c.
Lead, sheets	7.50c.
Antimony, Asiatic	10.00c.
Alum., virgin, 99 per cent, plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.00c. to 19.00c.
Solder, ½ and ½	32.50c. to 33.50c.
Babbitt metal, commercial grades	25.00c. to 60.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.75c.
Tin, bar	57.75c.

Copper, Lake	10.00c.
Copper, electrolytic	10.00c.
Copper, castings	9.75c.
Zinc, slab	5.75c. to 6.00c.
Lead, American pig	4.75c. to 5.00c.
Lead, bar	7.75c.
Antimony, Asiatic	9.00c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	59.75c.
Solder, ½ and ½	33.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	6.00c.	6.75c.
Copper, light and bottoms	5.00c.	5.87½c.
Brass, heavy	3.25c.	3.87½c.
Brass, light	2.87½c.	3.50c.
Hvy. machine composition	4.75c.	5.25c.
No. 1 yel. brass turnings	4.37½c.	5.12½c.
No. 1 red brass or compos. turnings	4.25c.	5.25c.
Lead, heavy	2.87½c.	3.37½c.
Zinc	2.25c.	3.00c.
Cast aluminum	9.62½c.	10.75c.
Sheet aluminum	11.00c.	12.50c.



the near future despite its attractive statistical position. In the Tri-State ore district the concentrate market has declined \$1 a ton in sympathy with refined metal. Production continues to be quite heavy at 7800 tons. Sales during the week totaled 6100 tons and stocks are currently estimated at 16,500 tons. The higher stock position coupled with a less brisk demand from smelters has placed the mining district in a less desirable position. It is expected that the situation will be somewhat improved if producers adhere to their plans to curtail output during the first two weeks of September.

Importing Firm Relates Tungsten Manipulations

THE rapid rise of tungsten prices and the difficulty of many American users to secure Chinese wolframite ore during the past year have been the result of the activities of a Monopoly Bureau of the Chinese Government. The workings of this bureau and the results which were attained is described in a report issued by Charles Hardy, Inc., New York, and Messrs. Bingham & Co., Inc., New York, representatives of Messrs. Carlowitz & Co., China.

The Chinese Monopoly Bureau at Canton, according to the report, was established by the South-West Government at the end of 1933. At that time the stocks of wolfram ore were quite low but the price had risen from H\$24 per picul (133.33 lb.) to about H\$70, as a result of a heavy demand during the latter half of the year. The Monopoly Bureau ruled out the usual law of supply and demand and by close supervision managed to increase stocks and maintain the price at the H\$70 level.

In February, 1934, a buying wave sponsored by European and Chinese-American speculators, was started and continued until the end of May. During that time tenders at the Monopoly Bureau overbid each other, and the firm attitude of the Government and the decreasing stocks resulted in the price advancing to H\$120. During the first five months of 1933 total exports were only 1500 tons, but in the same period in 1934 nearly 3000 tons was shipped. About 1900 tons went to European optional ports and Hamburg (partly destined for Russia), 600 to 700 tons was shipped to the United States and



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In either case, consider, please, The Duriron Company as a source of supply for corrosion-resisting alloys steel castings of any analysis.

All alloy steels made by The Duriron Company are produced in high frequency electric induction furnaces . . . the analysis is exact . . . the total carbon content is below .07% (a preventative of intercrystalline corrosion) . . . the castings are smooth and of a dense structure . . . and the quality is further evidenced by the doubling of the size of the foundry to take care of increasing business.

Standard products in the corrosion resisting alloys include centrifugal pumps, various types of valves, pipe fittings, tank outlets and similar equipment.

Circular No. 102, just printed, gives sizes and dimensions of Gate Valves in Durimet, Durco Alloy Steels and Alcumite (aluminum bronze). Want a copy?—we'll be glad to send it.

THE DURIRON COMPANY, Inc.
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around 400 tons went into French consumption.

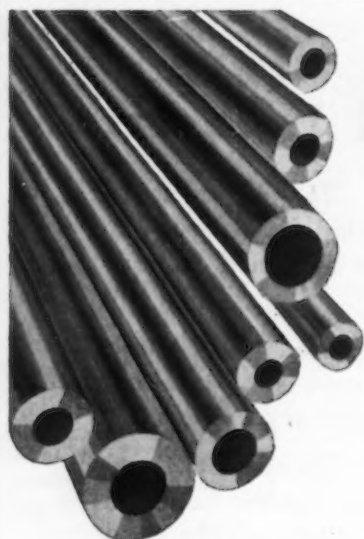
The recent German exchange and import restrictions brought about an absolute standstill of business at Canton as much of the European business was handled by German firms. At the end of May monopoly stocks were very low but the lack of demand resulted in an increase to about 500 tons. World market prices declined because earlier bought lots were offered afloat and small quantities of somewhat inferior smuggled goods were offered lower at H\$108. However, as in the beginning of its activities, the Monopoly Bureau continued to hold its offerings at the highest level reached.

Fresh demand, both from Europe and America, is expected to appear as a result of increased armament activities of major countries all over

the world. The Chinese Government, however, expects to continue its operations as in the past. That is the production will be lowered when demand eases and all efforts will be made to keep prices from dropping.

Detroit Scrap Fails To Show Activity

DETROIT, Aug. 28.—Nothing has occurred in the past week to lift the local scrap market out of its sluggish state. Consumer demand continues virtually at a standstill with steel mills asking for hold-ups of shipments of material due on current contracts. Pending a test of prices, quotations are nominal and unchanged.



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Fabricated Structural Steel

Awards in Good Volume—New Projects Higher

LETTINGS of 22,730 tons are almost double the 11,400 tons of a week ago. Outstanding awards are 4800 tons for the Cape Cod Canal Bridge and 2800 tons for work at the Norfolk Navy Yard. New projects, at 14,860 tons, compare with 13,900 tons last week. Fresh inquiries include 5000 tons for a syphon in connection with a project on the Malheur River, Ore., and 2500 tons for a bridge at Covington, Ky. Fabricated plate awards total only 2500 tons. Structural steel contracts in August, at 69,680 tons, compared with 46,500 tons in July, and 82,725 tons in June. Structural steel awards for the week follow:

NORTH ATLANTIC STATES

Buzzards Bay, Mass., 4800 tons, Cape Cod Canal railway bridge, to Phoenix Bridge Co.

South Hadley, Mass., 170 tons, library addition, to Ingalls Iron Works.

Waltham, Mass., 120 tons, bridge, to Boston Bridge Works.

Delaware & Hudson Railroad, 450 tons, bridge at Chazy, N. Y., to American Bridge Co.

Rochester, 800 tons, Elmwood Avenue bridge, to George A. Fuller Co.

Jamaica, N. Y., 450 tons, plant addition for Sheffield Farms Co., to Schaeffer Iron Works.

Philadelphia, 200 tons, factory addition for Joseph R. Farrell, to McClintic-Marshall Corp.

Philipsburg, Pa., 150 tons, State highway bridge, to Fort Pitt Bridge Works Co.

Belleville, N. Y., 115 tons, grade school, to Smith & Caffrey.

Schoharie County, N. Y., 315 tons, highway bridge, to Fort Pitt Bridge Works Co.

New York, 105 tons, building on Sixteenth Street, to George A. Just Co.

Big Tumbler Creek, N. J., 360 tons, highway bridge, to American Bridge Co.

Clearfield, Pa., 155 tons, highway bridge, to Fort Pitt Bridge Works Co.

Harmarville, Pa., 125 tons, research laboratory, to Keystone Engineering Co., Pittsburgh.

Cumberland, Md., 160 tons, bottling plant for German Brewing Co., to McClintic-Marshall Corp.

Baltimore, 400 tons, bridge deck plates, to American Bridge Co.

CENTRAL STATES

Cleveland, 1200 tons, 900 tons of plates and 300 tons of shapes for tank tops for Easterly Sewage Disposal plant, to Republic Structural Iron Works, Cleveland. Otis Steel Co. will furnish the plates.

State of Ohio, 200 tons, Hancock County bridge, to American Bridge Co.

Gary, Ind., 1700 tons, addition to Mill buildings, Illinois Steel Co., to American Bridge Co.

Cook County, Ill., 915 tons, two subway sections, to American Bridge Co.

Hannibal, Mo., 2670 tons, Mississippi River bridge, to Mount Vernon Bridge Co.

Hammond, Ind., 400 tons, piling, to Inland Steel Co. and Jones & Laughlin Steel Corp.

New York Central Railroad, 320 tons, bridge at Porter, Ind., to American Bridge Co.

Findlay, Ia., 210 tons, bridge, to American Bridge Co.

SOUTH AND SOUTHWEST

Norfolk, Va., 2820 tons, building for Navy Yard, to McClintic-Marshall Corp.

Benton County, Ark., 110 tons, bridge, to J. B. Klein Iron & Foundry Co.

Grundy County, Tenn., 135 tons, Collins River bridge, to Nashville Bridge Co.

Shreveport, La., 200 tons, building, to Jones & Laughlin Steel Corp.

Cassin, Texas, 490 tons, highway bridge, to Alamo Iron Works.

Rob Roy, Ark., 850 tons, bridge for St. Louis-Southwestern Railway, to Virginia Bridge & Iron Co.

WESTERN STATES

State of Idaho, 130 tons, bridge over South Fork Salmon River, to Minneapolis Steel & Machinery Co.

Ventura, Cal., 100 tons, packing plant, to Consolidated Steel Corp.

Las Animas County, Col., 100 tons, four State bridges, to an unnamed bidder.

Richmond, Cal., 500 tons, towers for Standard Oil Co., to Western Pipe & Steel Co.

Alaska, 805 tons, Douglass and Juneau bridge for the United States Board of Public Roads, to Pacific Car & Foundry Co., Portland, Ore.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

State of Massachusetts, 310 tons, highway bridges at Worcester and Randolph.

Mt. Carmel, Conn., 600 tons, Hamden high school; bids readvertised.

State of New York, 520 tons, bridges.

Washington, 2000 tons, extension to Internal Revenue building.

Washington, 250 tons, addition to Department of Interior building.

State of New York, 300 tons, highway bridges (seven).

Arcade, N. Y., 200 tons, State highway bridge; bids this week.

CENTRAL STATES

State of Ohio, 170 tons, two Hocking County bridges.

Detroit, 1100 tons, stock house for Stroh Brewing Co.

State of Iowa, 500 tons, three bridges.

Michigan City, Ind., 700 tons, filter plant.

State of Ohio, 550 tons, bridges.

Chicago, 200 tons, North Ashland Avenue bridge.

Germantown, Ill., 460 tons, bridge.

Washington, Mo., 2500 tons, previously reported vehicular bridge over Missouri River, bids to be opened Sept. 7. Sverdup & Parcel, St. Louis, engineers.

THE SOUTH

Covington, Ky., 2500 tons, bridge.

WESTERN STATES

Malheur River, Ore., 5000 tons, syphon.

San Jose, Cal., 750 tons approximately, city auditorium, new bids Sept. 10.

Los Angeles, Cal., 100 tons, three buildings at County farm, bids under advisement.

FABRICATED PLATE

AWARDS

Boston, 1500 tons, 6900 ft. of 48-in. welded pipe, to Walsh-Mt. Holyoke Steam Boiler Works.

Oakland, Cal., 1000 tons, dredge pipe for work on Trans-Bay bridge, to Pacific Coast Engineering Co.

NEW PROJECTS

Exeter, R. I., 100 tons, water tank.

Business and Politics
Need a Working
Agreement

(Concluded from Page 35)

business and politics must come into new relations with each other.

Business needs politics. For, in the end, politics rules. The controlling forces are not industrial, or financial, but social; and with these social forces it is the task of the politician to deal.

Government is a clumsy and hopeless instrument for the production and distribution of material goods and service.

Without the profitable operation of business there is not the faint shadow of a chance that the populations on whose support the politician depends will have such satisfaction in life as to make them content with the leaders whom they have chosen. Without that satisfaction there is for the politician no alternative save desperate leadership in the descending spiral of social destruction—an act not of politics but of lowest demagoguery. "Politics," like "business" and "profit," is an honorable term, and has its standards of conduct.

This essential alliance must be an open one. Its ends, while personally profitable, must be of such evident social worth that business can bring its personal and financial support to a candidate, to a policy, or to a party, without concealment and without shame.

New Way to Make
High-Pressure Drums

HIGH-PRESSURE drums, whether for oil-cracking operations or for steam generation in the modern high-pressure boiler shells, are now made in two ways. Either they are hollow forgings made from one solid steel ingot or they are welded from heavy plate material. There are arguments galore which contend that the latter are fully as safe and efficient as the former. It is a fact, however, that up to the present time heavier walled forgings can be made into such drums than can be made of welded steel plates.

A comparatively new development, originating, I understand, in Germany, is the forging of the main body of the boiler drum or shell and then welding on the dished or concave heads in which are the manholes. An even heavier wall thickness is thus possible.

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RED-STRAND

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WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.



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5909 KENNERLY AVENUE
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NEW YORK
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DENVER
SAN FRANCISCO

What Becomes of
Old Rails

STATISTICS have been compiled by the American Iron and Steel Institute covering the forms of product rolled in 1933 and 1932 from old rails. Though production of all rolled products in 1933 was 60 per cent ahead of that of 1932, a smaller tonnage of old rails was rerolled last year than in the year before, as indicated in the accompanying tabulation. Noteworthy also is the fact that the various forms of rerolled product did not hold close relationships for the two years compared.

For example, rerolled rails constituted about 10 per cent of the total tonnage of rerolled rail-steel products in 1933, while they accounted for less than 5 per cent in the preceding year. About 40 per cent was concrete rein-

forcing bars in 1933 and over 56 per cent in 1932. Merchant bars represented 18½ per cent last year and 12½ per cent the year before. Against only 61 tons of hot-rolled strip in 1933, a total of 2582 tons was reported for 1932.

Products Rolled From Old Rails					
1932			1933		
	Tons	Per Cent	Tons	Per Cent	
Concrete reinforcing bars.....	110,490	56.3	75,924	39.8	
Light structural shapes	41,879	21.4	52,173	27.3	
Merchant bars.....	24,265	12.4	35,227	18.5	
Rails	9,488	4.8	18,204	9.6	
Hot-rolled strip....	2,582	1.3	61	...	
Long angle splice bars and tie plate bars	1,268	0.6	1,398	0.7	
Cross ties.....	1,453	0.7	1,976	1.0	
Miscellaneous	4,861	2.5	5,508	2.9	
Total	196,286		190,471		

1932	1933
Other Forms	Other Forms
Rails	Rails
Merchant Bars	Merchant Bars
Light Structural Shapes	Light Structural Shapes
Concrete Reinforcing Bars	Concrete Reinforcing Bars

HY-TEN "B" TEMPER NO. 3X ANALYSIS

For machining at exceptional high degrees of heat-treated hardness thus avoiding scaling and distortion. Stock or mill shipment. Data sheets gladly mailed on request.

WHEELOCK, LOVEJOY & COMPANY, INC.
CAMBRIDGE CHICAGO CLEVELAND DETROIT

Valley Mills Curtail Operations As Labor Day Approaches

YOUNGSTOWN, Aug. 28.—Valley steel producers on Sept. 1 will have reaffirmed all third quarter prices for the coming period. Although the quoting on fourth quarter business is permitted under the code 30 days before the beginning of the quarter, establishment of quotations will be largely nominal, since there is an almost total disinclination on the part of consumers to buy ahead.

While August tonnage is showing up very favorably, when compared with July volume, the record this month has been far from auspicious. Tin plate, which started very slowly in the quarter owing to labor difficulties, is now setting the pace, with operations at about 35 to 40 per cent. A seasonal lull, however, is expected to drive operations to lower levels during the next two months. Sheets and strips are unusually sluggish, with little support offered by any important consuming group. Barbed wire, bale ties, wire fencing and galvanized corrugated sheets are in fair demand from Southern cotton-producing districts. Reinforcing bar tonnage is moving in better volume. A few small pipe line orders and a fairly steady demand for oil country goods have failed to rescue pipe mills from a prolonged lull.

The outlook for a general betterment in steel orders is momentarily vague. The major hope of Valley steel makers, who are primarily flat-rolled steel producers, is centered in the automotive industry's plans for 1935 models. Until motor car makers begin to order additional steel on a large scale, activity in this and nearby districts is not expected to display any real vigor.

One of the principal barriers to improvement, according to opinion here, is the apparent immunity of organized labor from Federal re-

straining powers, such as have been exercised on steel managements. The current hesitant character of consumer buying is believed to reflect the broad unsettlement that has grown out of labor problems. Replacement buying, which is considered long overdue, is expected to lift operations slightly early in September, but where a sharp upswing will find its impetus is not predictable at this time.

In the meantime, operations are tending downward. Most producers will curtail production sharply over the Labor Day week-end, with some suspending early this week. A leading independent will be practically closed in all departments until after the holiday. The leading producer will operate at only 10 per cent, while another independent mill will be scheduled at about 15 per cent. The Lowellville, Ohio, mill will probably operate only one open-hearth furnace through the week. An independent steel company blast furnace was banked last week.

Curtailment in raw steel production this week will not seriously affect the supply of steel for finishing mills, which generally are well stocked with semi-finished grades. Finishing mill schedules this week will be extremely irregular, and possible accumulation of orders until after the holiday may account for a spurt in activity next week. In the past month, most spot orders have been for immediate rush shipment, and have been placed usually with the mill able to make quick delivery of the particular grade of steel specified.

The raw material markets reflect the dull steel market. Fourth quarter pig iron prices will be established on Sept. 1 on the bases of third quarter quotations. Merchant pig iron business is chiefly for small lots, with orders very scarce. The scrap mar-

ket has remained virtually inert since the last sizable purchase early in August. Shipments to a large independent mill have been suspended, while movement to another important mill is very light. Prices are untested, with No. 1 heavy melting steel quotable at \$11, delivered. A distress lot of No. 1 steel is reported to have been sold at \$10.50, with no visible effect on the general market. Metallurgical coke is in light demand, despite meager consumer stocks. An increased demand for domestic coke is making its seasonal appearance.

Steel mill equipment business is a bright spot. Inquiries are still lively, and backlogs continue to afford regular engagements. The United Engineering & Foundry Co. will construct an 84-in. strip mill for cold-rolling strip up to 72 in. wide for the Ford Motor Co.'s River Rouge, Mich., plant.

Pipe Lines

Minnesota Valley Natural Gas Co., Odd Fellows Building, St. Peter, Minn., has approved construction of welded steel pipe line from gas fields in vicinity of Northfield, Minn., to St. Peter, about 40 miles. Branch pipe lines, distribution mains and distributing stations will be built at Montgomery, Le Center, St. Peter, New Prague and Le Sueur, Minn., where natural gas will be furnished. Cost over \$250,000.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 4 for quantity of galvanized welded steel pipe and steel tubing for Brooklyn, N. Y., and Sewell's Point, Va., Navy Yards (Schedule 3173).

Lindsborg, Kan., plans steel pipe line system for gas distribution. Cost about \$55,000. Special election called Sept. 11 to approve bonds in such amount. F. E. Devlin, Wheeler-Kelly-Hagney Building, Wichita, Kan., is consulting engineer.

Architect of Capitol, Washington, asks bids until Sept. 12 for new 37-in. steel pipe line on First Street, S.E., for water service at Capitol power plant.

Southern Gas Utilities, Inc., Houston, Tex., plans natural gas distribution system at Kyle, Tex., with metered supply station, requiring about 16,000 ft. 2 to 6-in. steel pipe. Cost about \$40,000.

Newberg, Ore., will take bids shortly on 12,000 ft. of water pipe.

Bridger, Mont., will take bids Sept. 10 for 20,000 ft. of 12-in. and smaller pipe.

Big Timber, Mont., opened bids Aug. 29 on 57,000 ft. of 6 to 14-in. water pipe.

Reinforcing Steel

Awards 18,415 Tons—New Projects 1730 Tons

Bourne, Mass., 220 tons, bridge, to Barker Steel Co.

Suffolk, Steuben, Richmond and Allegany Counties, N. Y., 675 tons, mesh for miscellaneous highway projects, to American Steel & Wire Co.

Burlington County, N. J., 210 tons, highway, to Sweet's Steel Co.

New York, 565 tons, Queens approaches to Tri-Borough bridge, to E. T. Edwards.

New York, 300 tons, export order to Panama, to Carroll-McCreary Co., Inc.

Columbus, Ohio, 3000 tons, sewer work, 1500 tons to Hausman Steel Co., Toledo, and 1500 tons to Ben-Tom Steel Co., Columbus.

Chicago, 275 tons, Fleischmann Yeast Co., to Concrete Engineering Co.

Minneapolis-St. Paul, 350 tons, Twin-City sewage disposal plant, to Concrete Engineering Co.

Bonneville, Ore., 12,128, dam powerhouse substructure and lock, to Pacific Coast Steel Corp.

Hannibal, Mo., 315 tons, vehicular bridge across Mississippi River; substructure 115 tons, to Union Bridge & Construction Co., Kansas City, and superstructure 200 tons, to Mount Vernon Bridge Co.

Los Angeles County, Cal., 378 tons, Barham Boulevard bridge over Los Angeles River, to Los Angeles Iron & Steel Co.

NEW REINFORCING BAR PROJECTS

Toledo, Ohio, 100 tons, dock work for Chesapeake & Ohio Railroad.

Revere, Mass., 400 tons, bridge over Saugus River.

Norfolk, Mass., 400 tons, prison industrial buildings.

Moline, Ill., tonnage being estimated for school building. Bids to be taken Sept. 6.

Washington, Mo., 300 tons, vehicular bridge across Missouri River; bids to be opened Sept. 7; Sverdup & Parcel, St. Louis, engineers.

San Jose, Cal., 300 tons approximately, city auditorium; new bids Sept. 10.

Pasadena, Cal., 200 tons, elementary school, bids under advisement.

Shafter, Cal., 120 tons, school, general contract awarded.

Los Angeles, Cal., 210 tons, three buildings at County farm, bids under advisement.

Cast Iron Pipe

City of New York has distributed 3465 tons of cement lined pipe and fittings up to 20 in. in size in the following manner: 1675 tons to United States Pipe & Foundry Co., 575 tons to Donaldson Iron Works, and 1215 tons to R. D. Wood & Co.

Public Service Corp. of New Jersey has awarded 180 tons to United States Pipe & Foundry Co.

Massachusetts will close bids Sept. 6 on 123 tons of 16-in. cement lined spigot, and 126 tons of 42 and 48-in. pipe, and 114 tons of bell and spigot, and 37 tons of flange special castings.

Lowell, Mass., has completed plans for a water system. Metcalf & Eddy, Statler building, Boston, are the engineers.

Chicago has closed for 2250 tons with Glamorgan Pipe & Foundry Co. and United States Pipe & Foundry Co.

Huron, S. D., has ordered 10,000 ft. of 14-in. pipe from United States Pipe & Foundry Co.

Grand Rapids, Mich., has placed 225 tons with James B. Clow & Sons.

Eureka, Cal., has awarded 105 tons of 8-in. to United States Pipe & Foundry Co.

Phoenix, Ariz., has advanced the date of bids to Sept. 4 for 940 tons of 2 to 24-in.

Fresno, Cal., took bids Aug. 30 on 320 tons of 6 to 10-in.

San Clemente, Cal., will take new bids Sept. 7 on 430 tons of 4 to 10-in.

Avery, Tex., opens bids about Sept. 30 for

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pipe line system for water supply; also for storage tanks. D. C. Wamsley, Thompson Building, Dallas, Tex., is consulting engineer.

Eureka, Mont., asks bids until Sept. 4 for 3180 ft. 8-in., 7920 ft. 6-in., and 7200 ft. 4-in. for water supply lines, including fittings. R. J. Hale, Missoula, Mont., consulting engineer.

Ashland, Kan., soon takes bids for quantity for extensions in water supply system; also for motor-driven pumping unit and accessories. Fund of \$32,000 has been secured through Federal aid. C. E. Hommon is city engineer.

Stevenson, Ala., plans pipe line system for extensions in water mains; soon takes bids for this and motor-driven pumping equipment. J. B. McCrary & Co., Inc., Atlanta, Ga., is consulting engineer.

Grafton, Ohio, takes bids at once for pipe line system for water supply and for steel water tower. R. F. MacDowell, Twelfth-Chester Building, Cleveland, is consulting engineer.

Bethlehem Water District, Delmar, N. Y., W. D. Jordan, engineer, plans pipe line for trunk main water service from new storage reservoir to Delmar and Elsmere. Fund of \$95,000 has been secured through Federal aid.

Elk City, Okla., plans pipe line system for water supply. Special election called Sept. 4 to approve bonds for \$150,000 for this and waterworks station. E. T. Archer & Co., New England Building, Kansas City, are consulting engineers.

Roanoke, Tex., plans pipe line system for water supply. Fund of \$24,000 has been secured through Federal aid. F. J. Von Zuben, Fair Building, Fort Worth, Tex., is consulting engineer.

Eden, N. Y., plans pipe line system for water service. Fund of \$73,000 has been secured through Federal aid. Fretts, Tallmy & Senior, 5488 Main Street, Williamsville, N. Y., are consulting engineers.

Paris, Mo., plans about 1800 ft. 8-in. for main water supply line; also 100,000-gal. capacity elevated steel tank and tower. Soon takes bids. W. B. Rollins & Co., Railway Exchange Building, Kansas City, are consulting engineers.

Bowie, Tex., plans pipe line system for water supply. Fund of \$164,000 has been secured through Federal aid.

Interlake Iron Corp. had net loss of \$221,585 in the quarter ended June 30. This compares with net loss in the second quarter of 1933 of \$282,848 after all charges.

Railroad Equipment

Pittsburgh, Shawmut & Northern is inquiring for two Mallet locomotives of the 2-6-6-4 type.

Woodward Iron Co., Woodward, Ala., is inquiring for 60 ore cars.

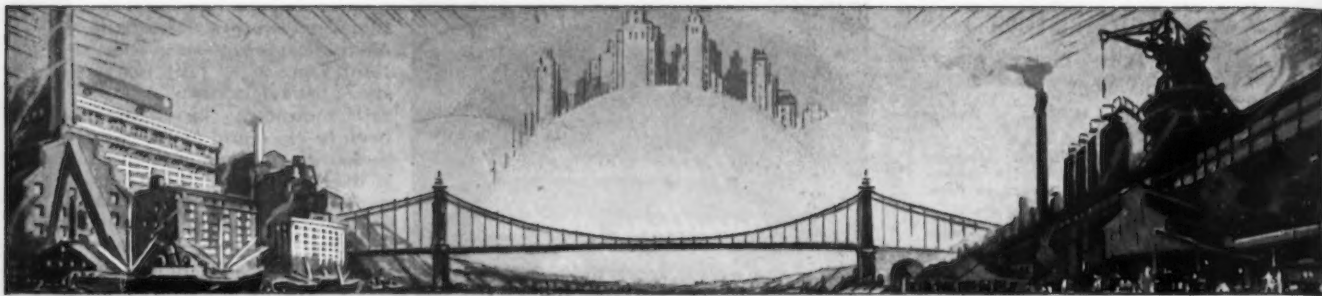
General American Transportation Corp. is building five tank cars for leasing.

RAILS

United States Engineers will take bids Aug. 31 at Kansas City, Mo., for 490 gross tons of 85-lb. rails, 1200 pair splice bars and 125 kegs of spikes for use at Ft. Peck Dam in Montana.

Discusses Dressing and Truing of Grinding Wheels

AN informative treatise on the "Dressing and Truing of Grinding Wheels" has been published by the Corborundum Co., Niagara Falls, N. Y., in the form of an attractively illustrated 48-page booklet. The author is H. J. Wills of the sales research department of the company. Star, locked-disk, precision steel, abrasive stick, mounted diamond and abrasive wheel type dressers are described briefly. A section is devoted to general application of abrasive wheel type dressers and another to diamond recommendations for specific applications. The latter includes data on Carboloy truing and dressing tools. General rules for the application of diamond tools and for miscellaneous truing and dressing are given and a section is devoted to dressing and truing procedure for internal, roll and several other specific classes of grinding wheels.



PLANT EXPANSION AND EQUIPMENT BUYING

Machine Tool Demand Is Still Dormant

THE combination of hot weather and "cold feet" has effectively retarded any expected signs of upturn in machine tool demand. Scattered orders for single machines are still thankfully received. If any of the intermediate term loans to industry have materialized, the machine tool industry has no particular evidence of it.

Uncertainty as to Washington policies, continuing difficulties with labor, struggles of factions for control of bureaucratic functions and ominous decisions by the labor boards are continuing to keep investment funds out of industry. The highlight of the week is an order for 30 presses for automobile body production.

◀ NORTH ATLANTIC ▶

J. K. Larkin & Co., Inc., Forty-ninth Street and Second Avenue, Brooklyn, iron and steel products, has leased block of property and buildings at Maurice Boulevard and Seventy-second Street, Winfield, L. I., and will improve and equip for new storage and distributing plant.

Department of Water Supply, Gas and Electricity, Municipal Building, New York, plans installation of pumping machinery and accessories, pipe lines, etc., for extensions and improvements in municipal waterworks plants and system. Fund of \$1,013,000 has been secured through Federal aid.

Dreisbach Engineering Corp., New York, has been organized by Charles A. Dreisbach, 120 West Forty-second Street, New York, and Edwin J. Dreisbach, 9 Whitney Avenue, New Haven, Conn., to manufacture machinery and tools.

Commissioner of Correction, State Office Building, Albany, N. Y., has asked bids on general contract for new one-story shop unit and addition to existing building at New York State Vocational Institution, Coxsackie.

Standard Oil Co. of New Jersey, 26 Broadway, New York, plans new oil storage and distributing dock and terminal on Shipyard Creek, Charleston, S. C. Cost about \$80,000 with equipment.

Wallerstein Laboratories, 125 Lake Avenue, Mariners Harbor, Staten Island, N. Y., food products, plans rebuilding of portion of storage and distributing plant, recently destroyed by fire. Loss over \$75,000 with equipment.

Board of Education, Long Beach, L. I., plans manual training department in new multi-story high school on 7-acre tract of land at Lindell Boulevard and Hudson Street. Cost about \$1,000,000. Financing is being arranged through Federal aid.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 7 for steam and water drums and headers (Schedule 3168) for Brooklyn and Charleston, S. C. Navy yards.

Superintendent of Lighthouses, St. George, Staten Island, N. Y., asks bids until Sept. 17 for 16 radiobeacon synchronizers (Proposal 46984).

Board of Education, Dobbs Ferry, N. Y., plans manual training department in multi-story high school. Fund of \$800,000 has been secured through Federal aid.

Crawford Engineering Co., Inc., New York, has been organized by Harvey D. Crawford, 485 Gramatan Avenue, Mount Vernon, N. Y., and Robert L. Ware, 324 Westchester Avenue, Crestwood, N. Y., to manufacture heating equipment for industrial plants and other service.

Cirillo Brothers Coal & Ice Corp., 1327 Thirty-eighth Street, Brooklyn, plans extensions in coal storage and distribution plant, including new coal-screening plant unit. Cost about \$35,000. Otto J. Sambach, 51 Chambers Street, New York, is consulting engineer.

Reichman & Hoffman Brothers, Inc., 124 Frelinghuysen Avenue, Newark, N. J., scrap metals, has leased tract of 1½ acres of land at 592-94 Ogden Street, fronting on Passaic River, and will improve and occupy for new storage and distribution plant.

Merck & Co., Inc., Rahway, N. J., manufacturer of chemical products, has let general contract to Wigton-Abbott Corp., 143 Liberty Street, New York, for two new additions, totaling about 13,000 sq. ft. floor space, for storage and distribution. Also general contract to Salmond Serimshaw & Co., 526 Elm Street, Arlington, N. J., for another one-story addition for factory expansion. Extensions will be made in steam power plant and additional equipment installed. Entire project will cost close to \$75,000 with equipment.

City Council, Cape May, N. J., soon takes bids for new 700,000-gal. elevated steel tank and tower at Madison and Columbia Avenues, for municipal water system. Fund of \$47,000 has been secured through Federal aid. Remington, Vosbury & Goff, 509 Cooper Street, Camden, N. J., are consulting engineers.

Commanding Officer, Frankford Arsenal, Philadelphia, asks bids until Sept. 4 for modifi-

cation of 16 sound locator trailers, including change from mechanical brakes to vacuum power brakes (Circular 57).

Hydrol Chemical Co., 135 South Forty-sixth Street, Philadelphia, manufacturer of industrial chemicals, etc., has purchased two-story and basement factory on site 48 x 215 ft., at 4424-30 Market Street, heretofore held by Atlantic Paper Co., and will occupy for new plant.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 4 for 100,000 ft. high-tension cable (Schedule 3177), for one full crawler type tractor (Schedule 3188), for Philadelphia Navy Yard.

Reading School District, Eighth and Washington Streets, Reading, Pa., plans manual training department in new multi-story junior high school at Front and Spring Streets, for which bids are being asked on general contract until Sept. 11. Cost close to \$1,000,000. Associated Architects of Reading, 147 North Fifth Street, are architects.

◀ BUFFALO DISTRICT ▶

City Council, Lockport, N. Y., is considering new municipal hydroelectric power plant on Eighteen-Mile Creek, with initial capacity about 4400 k.w. Cost over \$900,000 including transmission lines. Louis A. Harding, Prudential Building, Buffalo, is engineer.

Canada Foundries & Forgings, Ltd., Welland, Ont., plans rebuilding of portion of plant, including wrench shop, recently destroyed by fire. Loss about \$60,000 with equipment.

Cataract Sharpe Mfg. Co., 196 Winchester Avenue, Buffalo, manufacturer of glass products, plans new addition on Northumberland Street for storage and distribution. Cost about \$30,000.

◀ NEW ENGLAND ▶

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 4 for three hydraulic presses, each 15-ton capacity, for Newport, R. I., Navy Yard (Schedule 3178); for two refrigerating plants, each 5-ton capacity, and two such plants, ½-ton capacity, and spare parts, for Portsmouth, N. H., Navy Yard (Schedule 3165).

Handy & Harmon Co., Bridgeport, Conn., gold and silver refiner, has let general contract to Gellatly Construction Co., 25 Housatonic Avenue, for two new two-story plant units on Glasmere Avenue, Fairfield. Cost about \$20,000 with equipment. Headquarters are at 82 Fulton Street, New York.

Modern Machine Co., Haverhill, Mass., has been organized by Harry Gilbert and Reuben Plevinsky, 380 Washington Street, to manufacture machinery and parts.

State Public Welfare Commission, State House, Providence, R. I., plans extensions and improvements in power house at institution at Howard, R. I., including installation of new 500 hp. boiler and other equipment. Cost close to \$35,000.

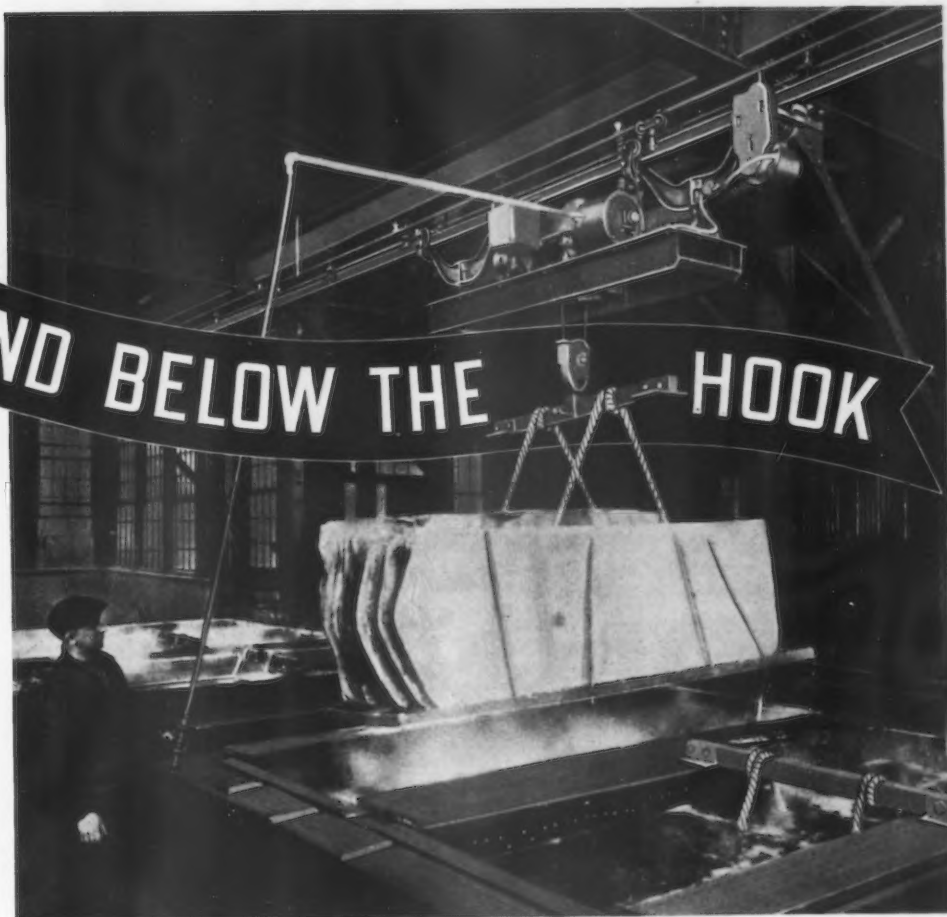
Superintendent, State Prison Colony, Norfolk, Mass., plans early construction of new industrial buildings at institution, for which financing has been arranged. Bids have been asked on general contract. M. N. Winslow is acting superintendent.

Safe-Dee-Fender Corp., Springfield, Mass., has been organized by Edward C. Leffler and Adelbert W. Smith, 44 Vernon Street, to manufacture automobile fenders and kindred metal products.

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bination of Osborn
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JOHNSON BRONZE

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New Castle, Pa.

Branch Offices and Warehouses

in Principal Cities

City Council, Quincy, Mass., soon takes bids for two elevated steel tanks and towers, 200,000 and 150,000-gal. capacity, respectively, for municipal water system.

◀ OHIO AND INDIANA ▶

Village Council, Hiram, Ohio, plans early call for bids for equipment, including Diesel engine-generating unit, for municipal electric light and power plant. Fund of \$32,500 is available. R. Husselman, Hippodrome Building, Cleveland, is consulting engineer.

Early & Daniel Co., Chamber of Commerce Building, Cincinnati, plans rebuilding of grain elevator recently destroyed by fire. Loss over \$150,000 with equipment. Horner & Wyatt, Board of Trade Building, Kansas City, Mo., engineers.

City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, has organized subsidiary under name of Ice Cooling Appliance Corp., to manufacture domestic and commercial refrigerators, air-conditioning equipment and kindred products. New company has arranged for purchase of plant and property of Rich Illinois Refrigerator Co., Morrison, Ill., which will be developed to an initial capacity of about 50,000 refrigerator and air-conditioning units per annum. Total investment in new plant will approximate \$100,000.

Cliffside Brewing Co., 242 West McMicken Street, Cincinnati, plans extensions and improvements in power house, including installation of new boiler, automatic stoker and accessory equipment. Bids will soon be asked. Fosdick & Hilmer, Union Trust Building, are architects.

Made-Rite Appliance Corp., Sandusky, Ohio, manufacturer of electrical appliances and devices, has arranged for merger with Weinig Products Co., 1814 East Fortieth Street, Cleveland, manufacturer of kindred specialties. Consolidated company has negotiations under way for acquisition of former plant of Ohio Motor Co., Sandusky, where it is proposed to consolidate and expand production.

American Playground Device Co., Anderson, Ind., manufacturer of amusement and sport devices and equipment, plans rebuilding of portion of plant recently destroyed by fire. Loss about \$70,000 with equipment.

Public Service Co. of Indiana, Indianapolis, plans new power substation, transmission and distributing lines for light and power service at Austin, Ind. Cost over \$75,000 with equipment.

◀ SOUTH CENTRAL ▶

Blair Distilling Co., 1820 David Stott Building, Detroit, recently organized, has selected site at Chicago, Marion County, Ky., for new three and four-story distilling plant, with machine shop, power house and other mechanical departments. Cost over \$100,000 with machinery. Company is arranging financing for about \$180,000, proceeds to be used for plant and operation. Thomas J. Nolan, Kentucky Home Life Building, Louisville, is architect.

Director of Purchases, Tennessee Valley Authority, New Sprinkle Building, Knoxville, Tenn., asks bids until Oct. 6 for two 66,000-hp. vertical shaft, plate steel spiral scroll case, single runner hydraulic turbine for Norris hydroelectric power plant; and for one similar unit, 45,000-hp. capacity, single automatically adjusted propeller, for Wheeler hydroelectric power station.

Sewerage and Water Board, New Orleans, La., takes bids early in fall for extensions and improvements in water and sewage plants and systems, including installation of pumping machinery and other power equipment, pipe lines, etc. Fund of \$1,800,000 has been arranged. Bryson Vallas is general superintendent.

United States Engineers Office, Memphis, Tenn., asks bids until Sept. 4 for one six-drum, cross deck, lap shaft type winch (Circular 69).

Common Council, Decatur, Ala., plans new municipal electric light and power plant. Fund of \$350,000 has been secured through Federal aid.

United States Engineers Office, Louisville, asks bids until Sept. 4 for new operating building complete with machinery at lock and dam No. 5, Green River, Ky.

George Stagg Co., Frankfort, Ky., distiller, has let general contract to J. D. Jennings, Louisville, for addition to storage and distributing plant, including improvements in present unit. Cost over \$65,000. Carl J. Kiefer, Schmidt Building, Cincinnati, consulting engineer.

◀ SOUTH ATLANTIC ▶

Spearman Brewing Co., Pensacola, Fla., has plans for new multi-story brewery at Barrancas Avenue and L Street. Cost over \$200,000 with equipment. Richard Griesser, 64 West Randolph Street, Chicago, is architect. Guy H. Spearman is president.

United States Engineers Office, Jacksonville, Fla., asks bids until Sept. 4 for four cast steel engine side pump heads, and for two cast iron stuffing boxes and glands (Circular 208).

Southern Public Utilities Co., Charlotte, N. C., plans extensions in transmission line from Fallston, N. C., to Belwood, Casar and vicinity, for electric light and power service.

Town Council, Lynchburg, S. C., asks bids until Sept. 4 for two turbine type deep well pumps and accessories, and for one hoisting tower and hoist. Ryan Engineering Co., Arcade Building, Columbia, S. C., is engineer.

Board of Public Works, Pensacola, Fla., soon takes bids for extensions and improvements in municipal waterworks, including pumping machinery, pipe lines, etc. Fund of \$239,918 has been arranged through Federal aid for this and sewage system improvements.

◀ WESTERN PENNA. ▶

Victor Brewing Co., Jeannette, Pa., has let general contract to B. R. Fulmer & Co., Greensburg, Pa., for new one-story addition to brewery, 100 x 105 ft., for mechanical bottling works and other service. Cost about \$90,000 with equipment.

Gulf Oil Corp., Seventh and Grant Streets, Pittsburgh, has approved plans for three new laboratory buildings at Harmarville, Pa., where such work will be concentrated in future. Cost about \$350,000 with equipment.

International Silver & Gold Corp., 1902 Oliver Building, Pittsburgh, plans development of silver properties in South America, with construction of new milling plant, flotation plant and other units, and installation of mining machinery. Company is arranging financing in amount of \$312,500, majority of fund to be used for purpose noted. Henry Wyman is president; Joseph P. Johnston is secretary-treasurer.

City Controller, City-County Building, Pittsburgh, has rejected all bids recently received for two municipal incinerator plants, and will ask new bids at early date. Cost about \$1,000,000 with power equipment, loading machinery, conveyors, hoists, etc. Department of Health, Ray P. Moyer, director, will be in charge.

◀ WASHINGTON DISTRICT ▶

Quartermaster Depot, Twentieth and C Streets, N. W., Washington, asks bids until Sept. 5 for 165 gasoline-electric generating sets, 5 kw. capacity each (Circular 42); until Sept. 19 for 1300 gas water heaters, using natural gas for fuel, 210 such heaters using manufactured gas, and 500 using coal (Circular 41).

Albemarle-Chesapeake Co., and Chesapeake Corp., West Point, Va., manufacturer of kraft paper stocks, paperboards, etc., affiliated interests, have let general contract to John T. Wilson Co., Mutual Building, Richmond, Va., for new two-story addition, 75 x 90 ft. Other expansion and improvements will be made at plant, including installation of additional equipment. Cost over \$250,000 with machinery.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 7 for one motor-driven key-seating metal-working machine, 10,000 ft. steel armored cable, 5000 ft. copper wire, 100 electric water heaters, 250 safety hand lamps, quantity of machine bolts, carriage bolts, steel rivets, brass or bronze pipe fittings, malleable iron pipe fittings, globe valves, gate valves, etc. (Schedule 2990).


Virginia Electric & Power Co., Richmond, Va., plans rebuilding of portion of power plant at Roanoke Rapids, N. C., recently damaged by fire. Loss about \$35,000 with equipment.

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Unit of Union Carbide  and Carbon Corporation
Carbide and Carbon Building, 30 East 42nd Street
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NEW ENGLAND HIGH-CARBON WIRE CO.
MILLBURY, MASS.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 4 for one motor-driven double housing planer (Schedule 3169), two motor-driven double housing planers (Schedule 3176), two motor-driven boring mills (Schedule 3186), one motor-driven metal planer (Schedule 3175), two metal planers (Schedule 3171), quantity of corrosion-resisting steel sheets and floor plates (Schedule 3169), two motor-driven engraving machines (Schedule 3187), for Washington Navy Yard.

◀ MICHIGAN DISTRICT ▶

Dow Chemical Co., Midland, Mich., manufacturer of industrial chemicals, has awarded general contract to H. C. Weber Construction Co., Bay City, Mich., for new addition, 100 x 200 ft., to Bay City plant, and for new one-story addition to main plant at Midland. Cost over \$65,000 with equipment.

Welding Accessories Co., 1627 West Fort Street, Detroit, has been organized by Benjamin H. Bowlus, 17592 Wisconsin Avenue, and associates, to manufacture welding equipment and devices.

Kalamazoo Vegetable Parchment Co., Kalamazoo, Mich., has plans for new two-story addition to paper mill, 80 x 120 ft., for storage and distribution. Cost about \$40,000 with equipment. M. C. Billingham, Kalamazoo, is architect.

◀ MIDDLE WEST ▶

Pheoll Mfg. Co., 5700 West Roosevelt Road, Chicago, manufacturer of bolts, nuts, screws, etc., has asked bids on general contract for new one-story addition, 70 x 190 ft. Cost about \$30,000 with equipment. Alfred S. Alschuler, 28 East Jackson Boulevard, is architect.

Construction Service, Veterans' Administration, Washington, asks bids until Sept. 25 for electrical distribution system for institution at Danville, Ill.

Hughes Oil Co., Howard Street, Evanston, Ill., plans rebuilding of portion of oil storage and distributing plant recently damaged by fire. Loss about \$50,000 with equipment.

Champion Oil Burner Mfg. Co., Inc., Minneapolis, Minn., has been organized by Edward J. and George A. Becker, 5341 Ewing Avenue South, to manufacture oil burners and oil-burning equipment.

Common Council, West Point, Neb., asks until Sept. 6 for Diesel engine-generating unit and auxiliary equipment for municipal electric

light and power plant. William A. Stieren, town clerk, in charge.

John Kellogg Co., Chamber of Commerce Building, Minneapolis, Minn., has plans for new grain elevator at Twelfth Avenue S. E. and line of Great Northern Railway, and soon begins work by day labor. Cost about \$75,000 with tanks, loading equipment, screening machinery, conveyors, etc. W. G. Kellogg is manager.

District Commander, Tenth Forestry District, Camp Elcho, Elcho, Wis., asks bids until Sept. 6 for power house, pumping plant, one-story service and garage building, one-story equipment storage and distributing building, and other structures at Camp Newald, Newald, Wis. (Circular 46).

Electrical Connectors & Mfg. Co., South Milwaukee, Wis., has placed general contract with Martin Nirschl & Co., local builders, for erecting new forge and machine shop to replace buildings burned recently. Machine tool requirements are being formulated. William D. Kyle is president.

City Manager, H. C. Laughlin, Kenosha, Wis., is preparing to ask bids for construction of standpipe, pump house and booster pump for which Federal aid of \$100,000 has been allotted. Alvord, Burdick & Howson, 20 North Wacker Drive, Chicago, are consulting engineers.

Columbia Mineral Wool Co., South Milwaukee, Wis., has started work on rebuilding blowing room shop badly damaged by fire recently. Jacob Kreiser is general superintendent.

United States Lighthouse Superintendent, 432 Federal Building, Milwaukee, has accepted bid of Fairbanks, Morse & Co., Chicago, to furnish nine Diesel engine generating plants at \$10,743.30. Capt. Charles H. Hubbard is superintendent.

Super Steel Products Co., 325 West McKinley Avenue, Milwaukee, is low bidder at \$27,800 for furnishing seasoning chamber unit to United States Forest Products Laboratory at Madison, Wis. Economy Engineering Co., Chicago, is low bidder on elevator for testing machine at \$3,875.

R. Connor Co., Marshfield, Wis., contemplates erection of new sawmill at Connorville (Mail Wakefield), Mich., in its Thomaston timber holdings.

Common Council, Bessemer, Mich., has plans by Suhr, Berryman, Peterson & Suhr, consulting engineers, 130 North Wells Street, Chicago, for new sewage treatment plant estimated to cost \$90,965, for which Federal aid has been allotted. Bids will be asked shortly. Leo Mueller is city clerk.

◀ SOUTHWEST ▶

Alco Valve Co., Inc., Maplewood, Mo., has let general contract to Charles P. Grady & Co., 111 North Tenth Street, St. Louis, for new one-story addition, 50 x 110 ft., including improvements in present plant. Cost about \$25,000 with equipment. John L. Schrode is head.

City Council, McPherson, Kan., asks bids until Sept. 5 for extensions and improvements in municipal power plant. Fund of about \$50,000 has been arranged. Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., is consulting engineer.

United States Engineers Office, Postal Telegraph Building, Kansas City, Mo., asks bids until Sept. 6 for four two-drum hauling winches for land booster cars (Circular 88).

Porterfield Aircraft Corp., Kansas City, Mo., has been organized by E. E. Porterfield, Jr., 810 West Fifty-ninth Street, to manufacture airplanes and parts.

Department of Public Works, Kansas City, Mo., soon takes bids for new power house and refrigerating plant, mechanical laundry and garage, service and repair building, one and two-story, 122 x 160 ft., at General City Hospital. Cost about \$400,000 with equipment. A. W. Archer & Co., Pioneer Trust Building, are architects.

Shawnee Milling Co., Shawnee, Okla., plans early rebuilding of portion of flour milling plant recently destroyed by fire. Loss over \$100,000 with machinery.

Common Council, Marble Falls, Tex., soon takes bids for equipment for municipal waterworks, including 50,000-gal. elevated steel tank and tower, two motor-driven pumping units, each 250 gals. per min. capacity, pipe lines, etc. Fund of \$43,000 has been arranged. H. R. Helland, Frost National Bank Building, San Antonio, Tex., is consulting engineer.

◀ PACIFIC COAST ▶

Napa Valley Cooperative Winery, Calistoga (Napa County), Cal., has let general contract to W. W. Williamson, 320 Market Street, San Francisco, for extensions and improvements, including new addition for fermenting and storage departments. Cost about \$40,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 7 for 38 portable electric drills (Schedule 3160), for 34,200 ft. plow steel wire rope (Schedule 3164), for Mare Island, Cal., Navy Yard.

Los Angeles Water and Power Bureau, 207 South Broadway, Los Angeles, asks bids until Sept. 4 for 15 lightning arresters, each with rating of 37.5 kw., for Mono Basin electric project, Mono County (Specification 1482).

Silver Foam Brewing Co., Canal and West Fortieth Streets, Ballard, Seattle, soon takes bids on general contract for new three-story brewing plant, 75 x 375 ft., with seven-story tower unit. It will be equipped for capacity of about 100,000 bbl. per annum. Cost \$200,000 with equipment. Henry Bittman, Securities Building, is architect. J. W. Phillips is vice-president.

Board of Water and Power Commissioners, 207 South Broadway, Los Angeles, plans extensions and improvements in municipal power and water systems to cost about \$500,000 with equipment. Electrical program includes new electrical distribution station and equipment, cost \$133,000; extensions and improvements in present electrical distribution stations, \$152,000 with equipment; improvements in electrical transmission lines, \$10,000; overhead distribution lines, \$60,000; new oil circuit breakers and auxiliary equipment in industrial stations, \$39,000; underground distribution system, \$45,000.

Solastic Products Co., 3018 Airport Way, Seattle, manufacturer of paint, varnishes, etc., has plans for new two-story plant, 80 x 100 ft., at 5232 Shilshole Avenue. Cost about \$30,000 with equipment. Alban A. Shay, 406 Aurora Avenue, is architect.

Jahns Quality Pistons, Inc., Los Angeles, has been organized by W. H. Jahns, Ivan Stauffer and associates, care of Harry J. McClean, 650 South Spring Street, representative, to manufacture pistons for automobile engines and kindred products.

Sacramento Municipal Utility District, Sacramento, Cal., Albert Given, chief engineer, is having surveys and reports made by Burns & McDonnell Engineering Co., 107 West Linwood Boulevard, Kansas City, Mo., consulting engineer, for new public-owned hydroelectric power plant and electrical distribution system in Sacramento Valley district. Cost over \$10,000,000.



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Additional information on the use of Plykrome in specified installations may be had upon request.

A striking indication of the difference between ordinary 18-8 stainless and the stabilized 18-8 used as the surface veneer on USS Plykrome. Here a piece of low carbon USS 18-8 (on the left) has been welded to USS Stabilized 18-8 (on the right) and subsequently put in an acid bath. Note the manner in which the unstabilized steel has been corroded adjacent to the weld. The stabilized stainless, however, is entirely free from attack.



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Camber on Long Single Casting

(Concluded from Page 23)

with the upper face of the frame, slicked, and, after the edges were swabbed, the pattern was drawn out, the mold being then finished and plumbago coated in accordance with standard practice.

On this—the first day—all the internal cores forming the body of the casting, as well as those to be used as covers in place of a cope flask, were made, a sharp river sand and manufactured core oil mixture being used for both. A smaller oil to sand

flush with the top and bottom of the pattern. A plain square mold is thus formed, saving much time in the foundry; also, as the bulk of each core's total weight was thrown into the print allowance, no chaplets were necessary. The sectional view of the pattern given in Fig. 6 demonstrates this important factor, while Fig. 7, showing the pattern with coreprint as it would have left the average pattern shop, gives an idea of the increased cover core and chaplet cost

the highest area of the casting, with a view to preventing coldshots. D,D are overflow risers placed on the machining pads to lessen the static pressure set up at the moment the mold is full of metal.

The question of baring strategic points to hasten cooling of the heaviest sections was disposed of by taking the cover cores off the cross rib in the center, thus exposing the three center pads. A little sand was also dug from under the casting along each side wall in that area, the rest of the job being left covered and weighted until cold. The sand around the end sprues was, incidentally, slackened to permit easy contraction.

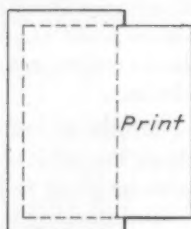


Fig. 7—Pattern as it might have been wrongly made, using standard type projecting core prints.

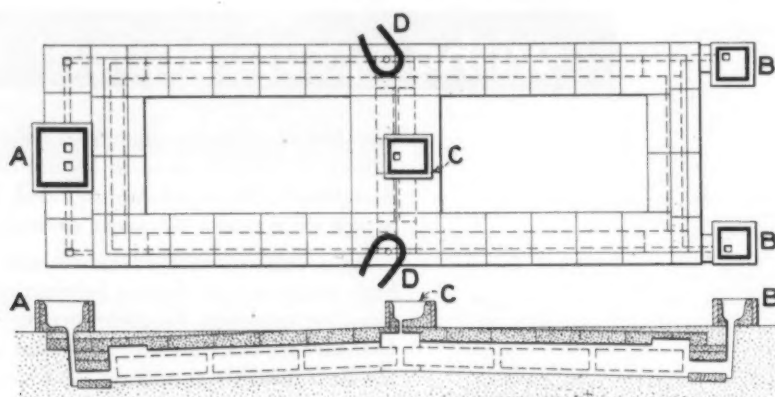


Fig. 8—Plan and sectional views of closed mold. A, A are main gates; B, B bull ladle inlets; C, C auxiliary runner on cross member; D, D overflow risers at highest point.

ratio was used in the cover core mix than in that for the body cores, to insure greater strength and avoid risk of breaking the cover cores when binding the mold down. A liberal iron reinforcement was also considered advisable for the same reason.

The open frame box used when making the 30 plain flat cover cores is shown at Fig. 3. The same frame, with an added bottom board and an adjustable thickness piece, was employed to form the pads, being indicated at Fig. 4. Ten cores of this type were used, the thickness piece being moved to accommodate right or left hand cores as required.

As to the internal or body cores, no special comment is necessary. A substantial coke vent was placed in each, very largely to assist easy contraction, while a single lifting loop of hairpin type, as seen at Fig. 5, facilitated matters when placing the cores in the mold.

Attention is here drawn, however, to the pattern maker's foresight in laying out the job with the coreprints

if the pattern had been made that way.

Coring, closing, binding, and pouring the metal on the second day presented no unusual features, except that after the body cores were placed, the cover cores were set to correct position by measurement, those forming the pads on the center cross member being placed first, those necessary to form the corner pads next, and the intervening spaces filled in last with the plain flat cores made for the purpose. A little filing to ensure a neat fit was of course necessary at some of the joints, while others, showing a slack fit, were stuffed with clean cotton waste to prevent sand working down into the mold.

Views of the closed mold in plan and section at Fig. 8 give the gate and riser arrangements; A,A show the main gates to accommodate the crane ladle, B,B those on the corners to receive the metal from the bull ladles; and C,C the auxiliary "pop" gate placed on the center cross rib, also fed from a smaller ladle to flood

When checked up, cold, on the third morning, the casting was $\frac{1}{4}$ in. crooked on its length of 16 ft., the ends having risen 1 in. instead of the $\frac{1}{4}$ in. estimated. This condition was remedied in the usual way, the casting being propped up evenly at each end, weighted in the center, down to two other props placed under the cross member, brought to a cherry red heat and allowed to become cold again before the weights were removed. The natural tendency of the piece to spring back to its original shape was counteracted by forcing the center down a little lower than the ends. The accurate six point touch formed by the six measured props prevented any chance of further distortion during the straightening operation just described.

A slightly increased manganese percentage in the regular semi-steel mixture used in the shop, bringing that element up to 0.80 per cent of the metal as poured, gave the casting additional resiliency, and simplified the straightening process considerably.

▲▲ THE IRON AGE ▲▲ September 6, 1934 ▲▲

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